October, 1949

EDISON ELECTRIC INSTITUTE BULLETIN

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UBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

July, 1948-1949

SOURCE AND DISPOSAL OF ENERGY—MONTH OF JULY

	1949	1948	%
GENERATION* (Net)			
By Fuel Burning Plants	16,354,555,000	16,443,487,000	− 0.5
By Water Power Plants	7,329,785,000	6,851,093,000	+ 7.0
Total Generation	**23,684,340,000**	**23,294,580,000**	**+ 1.7**
Add—Net Imports Over International Boundaries	68,800,000	97,300,000	−29.3
Less—Company Use	120,732,000	117,102,000	+ 3.1
Less—Energy Used by Producer	338,830,000	470,253,000	−28.0
Net Energy for Distribution	**23,293,578,000**	**22,804,525,000**	**+ 2.1**
Losses and Unaccounted for	3,333,266,000	3,437,180,000	− 3.0
Sales to Ultimate Customers	**19,960,312,000**	**19,367,345,000**	**+ 3.1**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of July 31st			
Residential or Domestic	34,601,010	32,678,145	+ 5.9
Rural (Distinct Rural Rates)	1,747,965	1,634,816	+ 6.9
Commercial or Industrial:			
Small Light and Power	5,231,599	5,076,042	+ 3.1
Large Light and Power	229,535	199,576	+15.0
Other Customers	144,303	137,915	+ 4.6
Total Ultimate Customers	**41,954,412**	**39,726,494**	**+ 5.6**
KILOWATTHOUR SALES—During Month of July			
Residential or Domestic	4,419,061,000	3,822,845,000	+15.6
Rural (Distinct Rural Rates)	825,215,000	636,515,000	+29.6
Commercial or Industrial:			
Small Light and Power	3,975,046,000	3,653,012,000	+ 8.8
Large Light and Power	9,532,670,000	10,035,498,000	− 5.0
Street and Highway Lighting	184,163,000	169,810,000	+ 8.5
Other Public Authorities	516,094,000	489,158,000	+ 5.5
Railways and Railroads:			
Street and Interurban Railways	274,757,000	304,733,000	− 9.8
Electrified Steam Railroads	187,378,000	203,161,000	− 7.8
Interdepartmental	45,928,000	52,613,000	−12.7
Total to Ultimate Customers	**19,960,312,000**	**19,367,345,000**	**+ 3.1**
Revenue from Ultimate Customers	**$375,418,900**	**$348,380,100**	**+ 7.8**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended July 31st			
Kilowatthours per Customer	1,635	1,513	+ 8.1
Average Annual Bill	$48.56	$45.84	+ 5.9
Revenue per Kilowatthour	2.97¢	3.03¢	− 2.0

(*) By Courtesy of the Federal Power Commission.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 17 OCTOBER, 1949 No. 10

What Can One Man Do?

By Elmer L. Lindseth

President, The Cleveland Electric Illuminating Company, and
President, Edison Electric Institute

An address before the Annual Convention of the Indiana Electric Association
French Lick, Ind., September 28, 1949

AT this meeting I know you will be discussing what is certainly the most critical and urgent domestic problem America faces—the trend toward the socialistic state, with its planning and regulation of all phases of living.

In tackling this problem, you are typical of an increasing number of our fellow citizens both within and without our business who have become alarmed at the ever widening intervention and authority assumed by the government in the affairs of individual citizens, and at the drift in America toward the socialistic state.

Government Influence Opposed by Informed 3 Out of 5

A recent research study by Central Surveys, showed that three of every five persons questioned among opinion-forming groups thought the trend toward greater government influence was pronounced, regarded this trend as harmful and believed it will affect them adversely.

This growing awareness of the problem is encouraging. But there is little encouragement in the fact that relatively few of the persons questioned had done anything to oppose the trend.

Only one in seven could recall any specific activities in which he had engaged to stem the tide. But two in every five did say "they want to work against this trend, *but don't know exactly what to do." Two in every five don't know what they can do!*

These statistics indicate that although there is reason for hope that effective and sensible opposition can be marshaled against undesirable trends, a large segment of the population, and mind you these are opinion-forming people, still needs not only to be convinced of the existence of the problem and of the need to do something about it—but also to be told just what it can do.

What Can Anyone Anywhere Do?

Just what can one man do to help stem this tide of federalization of the national life? Not necessarily a person in our industry. Just anyone, anywhere. A teacher, a housewife, a foreman, a farmer, a businessman, or a doctor.

I should like to review a list of specific ideas with you—a "do" list. I am an amateur at this. The ideas are not original with me, but they do reflect the experience of many people like yourselves who have been earnestly concerned about these threats to liberty, and who have been doing something about them.

But before submitting these ideas to you, I must state my conviction that this isn't the kind of job we can delegate. It's an individual effort which must be made at the grass roots by each of us who wants to help.

Dedicated Men

In view of the magnitude of the forces lined up against us, and the momentum these forces have gained, we are going to have to become dedicated men if we are to win out. No lesser degree of devotion will do.

The people who are pushing ideas which will lead us inevitably to a socialistic state have a fanatical fervor. They believe theirs is the only true economic and political gospel, and they are fanatically striving to force it on the unbelievers.

Many of these zealots are in the government. There they are free to spend their full time working on their schemes. By contrast, most of us devote but a pitifully small share of our time to combating their propaganda.

To do an effective job, we must match the fervor and the endeavor of the nationalizers. We must have the will to win. As L. R. Boulware, vice-president of General Electric, has said, "We must be born again."

Six Specific Steps

Once we are dedicated to work for freedom, and have faith that our efforts can be productive, once we have resolved that we *can* help and *will* help, what specific steps can we take?

First, we have got to get informed. We must educate ourselves on the ideals, economics and advantages of the American system.

In plain English, we must know what we're talking about.

Unfortunately, this isn't quite as simple as it sounds.

Too few of us businessmen know—much less are able to express clearly to others—the simple fundamentals of our free American economic and political system, its virtues, and its values.

Let's ask ourselves—

Can we simply and effectively explain the function of savings and investment

in providing the tools which multiply the productivity of labor?

Can we explain the benefits of incentives and competition, as contrasted with the repressive effects of government planning and bureaucratic control?

Can we explain how *only* under the capitalistic system real wages will be increased?

Paradoxically, the nationalizers often know a great deal more about the American economic system than the exponents and advocates of free enterprise.

Know As Much As Your Adversary

Many collectivists in this country are outstanding students of economics. They follow the fundamental idea that before they can attack the American system, they must know more about it than its defenders.

We too will do well to know as much as possible about our adversary.

J. L. Singleton, vice president of the Allis-Chalmers Manufacturing Company, put it this way—

"As in any other sales problem, we must thoroughly acquaint ourselves with our own product and know plenty about our competition."

It isn't easy to tell you how to broaden your knowledge, but a few obvious methods can be pointed out. These include constant study of all phases of the subject, first-hand observation of the effects socialistic measures have had on various industries already, and discussion with other persons who are affected and concerned.

I might also add that as in all education, the process of learning this subject must be a continuous one. There can never be an end to it and you can never know too much.

Real Human Problems

A well-rounded study of the American system leads to the conclusion which is the second of the suggestions I have to make for an individual who wants to help in this struggle. It is this—

We must recognize that many proposals for reforming the American economy stem from real human problems.

Sumner Slichter, of the Harvard Graduate School, in an analysis of the lack of confidence in business which is expressed in many quarters, said this—

"It is true that many proposals for reforming the economy are ill-considered and impracticable. This does not mean, however, that the proposals do not spring from real problems . . .

"Much of the opposition of business to public policies now in effect was quite unnecessary, even from the standpoint of the narrow special interests of business.

"Certainly business cannot be expected to have influence in the future unless it shows awareness of the problems confronting employees, farmers, and consumers, *and unless it is willing to offer constructive proposals for dealing with these problems.*"

As a corollary to Professor Slichter's remarks, we should recognize that government always tends to fill any void left by private enterprise. If there is a strong demand for something, and business fails to meet the demand, government will step in.

Business has suffered because it has not maintained the full confidence of the public. One way to gain more confidence is to refrain from an ostrich-like attitude toward the legitimate needs of the people for security, opportunity and progress.

A Positive Program

Recognition that problems exist must be followed by action, which leads to my third point—

We must work for right things, not merely against wrong things.

There is a political maxim, "You can't beat somebody with nobody." Neither can we beat something with nothing.

We are not going to blunt the edge of collectivism by merely railing against it. Nor are we going to accomplish much by trying to stand pat, trying to defend our present system as perfect. As always, a good offense is the best defense.

I repeat, we must be for something. We must take the initiative.

We must contend for those things which appeal to the true self interest of the many.

Just what are we working for? Isn't it an expanding economy of freedom, opportunity and competition? Isn't it an ever rising standard of living achieved through ever increasing the tools and skills of productivity? Isn't it the security and independence that come with freedom, as contrasted with the slavery of collectivism, in business and industry, in the professions, or in any other walk of life?

We can be for change. We can concede that the American economic system should be and will be improved.

We can proudly defend our economic system and the benefits it has produced. We can be for the ever rising standard of living which this system has provided and will continue to provide. We can be for multiplying the opportunities it has given our 150 million citizens, including you and me.

Yes, we can be for every good thing already here, and yet to come. And we can honestly promise to preserve the good we have, and promise to make it even better.

The Oldest Fraud in History

James H. McGraw, Jr., president of McGraw-Hill, put the problem this way at the EEI convention—

"The public *must learn* that socialism is reactionary, that it is the oldest fraud in history that only freedom is new and progressive.

"I believe we can win public support for a positive program. I believe that such a program is in the public interest. I believe that we cannot stand still and survive as a free industry . . ."

Having determined what we stand for and how we are going to proceed, we must get our story across. My fourth point, therefore, is this—

We must spread the story of the superiority of the American system, in terms everyone can understand and accept.

Each of us must do this, out of his own experience, in his own way, in terms of how it affects the lives of his listeners.

It is a compelling story we have to tell—a story we can be proud of. Someone has called it "the greatest untold story."

The facts of this story we have all around us. What each of us has to do is to weave these facts into a simple, straight-forward, cohesive message.

Explain, Not Sputter

Let our message tell simply and clearly what we are for, and what we are against. Let it tell how and why the so-called welfare state—the socialistic state—is a delusion and a snare, leading to austerity, starvation and oppression. Let it tell the simple story of the economics of freedom, of capital, of labor of profits and progress. Let it tell the peerless strength inherent in our system of freedom for business and industry for the individual citizen and for those who join together with their savings and their services to produce more and better things for more people.

Let's—as Dean Russell puts it—

ble "to explain instead of, like most, only sputter on behalf of liberty."

One point is important. Communication in this field is abstract, difficult and largely undeveloped.

Those of you who have spoken on the economics of the American system to your employees, or written about it in your employee magazines, know it isn't easy.

Talk in Simple, Real Terms

Progress is being made, but slowly. But we all must work at it. Abstractions and generalities won't do. We must talk in simple terms of our own experience, and that of our listeners. It is absolutely fundamental that they realize that IT not only *can* happen here, to them—as it has happened in England—but it *is* happening to them, now, every day.

Let's tell this story to our employees, to our customers, our neighbors, our friends. Let's tell it to all who will listen. Let's reconvert those who have been proselytized by our enemies.

People want to hear this story. They will listen.

Numerous surveys have demonstrated the value of telling employees the story of how the American business system benefits the nation. No other field is as fertile and productive. Many of you are sowing the good seed in this field. Everyone should.

Employees want the truth. Once they have it, they can be extremely potent salesmen of free enterprise.

Our employees come in contact with people in all phases of our economy. They will sell free enterprise in these daily contacts, if we merely give them a few selling aids.

Uninformed Majority Favor Statism

A recent survey by Opinion Research disclosed that 83 per cent of employees who were *uninformed* about the benefits of the American economic system, were wholly or partially in favor of government domination of business and the national life. Only 17 per cent believed in anything like what we call free enterprise.

But among well-informed employees, 75 per cent upheld free enterprise. Only 25 per cent could be classed as partial or extreme collectivists.

The media for getting "the word" to employees are familiar to all of us—employee publications, letters, foremen meetings, employee education programs, and various other avenues of communication. But the techniques of using these avenues are not easy, or well developed.

Few companies are using very thorough and effective means of getting economic facts to employees. Either the basic story, or the method of telling it, or both, are still in need of improvement. This is not a criticism. Rather it is a challenge to do a job as yet undone.

Other opportunities exist in our daily personal contacts with people who are not yet as steamed up over the situation as they ought to be. Especially, let's tell it to the youth of the country. Then there are numerous organizations, from churches to luncheon clubs, where discussion of current problems is encouraged. Let's avail ourselves of every opportunity to tell them the story.

It may not be easy to bring yourself to do this. And many of your associates at all levels of management may feel unsure about taking on the task. But urge them to do it. They soon will find they enjoy telling people the story, and the listeners are grateful for the information they receive.

A Personal Interest in Government

Telling the story is one kind of action we can take. There is another which can be summed up in my fifth suggestion—

We must take a more alert personal interest in government, and implement our interest by personal action.

It isn't enough to learn and spread the story of sound economics. To put an informed public opinion to work, we must impress our opinions on government at all levels, from the school board to the White House.

It may be impractical for many of us to run for elective office particularly at the national or state levels. But at the local level there are many public offices in which businessmen can make priceless contributions to the public welfare.

Even if we find it impossible to participate in government to the extent of running for office, we can appear before congressional committees, and accept appointment to administrative jobs. Surely, we can watch vigilantly every proposal for legislation affecting our American economic system.

Before Congress or any other legislative body votes on any such measure, we can act singly and through organizations to let our representatives know how we think and where we stand on it.

Unfortunately, the phrase "Write your congressman" has been bandied about so much that too few people with our economic leanings take the trouble to write their congressmen. But it's still a sound idea—and an important one.

A surprising number of people will confess they don't quite know how to go about the process. Let's tell them—and help them.

Congressional "Thank You" Notes

Congressmen report that the bulk of their mail comprises letters asking for this, or protesting against that. Not many "thank you" notes come in. When a congressman votes the way we think he ought to, let him know we appreciate it.

The No. 1 control of the philosophy of something-for-nothing is the control of governmental expenditures.

So, if there is one kind of legislation to which we all must pay the closest attention, it is that which makes possible the needless spending by the government.

Whenever the government takes over more functions of business, or showers the gratuities of the hand-out state on more people, that costs money—not millions, but billions!

That money can come only from higher taxation. And the one sure way to curb the further socialization of the U. S. A. is to curtail government budgets, appropriations and expenditures.

As Mr. Hoover pointed out in his 75th birthday speech, the American standard of living will start to decline unless the present trend of ever-increasing taxes is curbed.

Selling the Idea of Economy

American businessmen, who have demonstrated to the world that salesmanship is one of our higher arts, can find no better use for their talents than in *selling the idea of economy and reduction of spending* by government.

My sixth and final point overlays all the other suggestions and is partly dependent on them.

We must truly deserve the confidence of the people.

We are all aware of the decline in prestige of American business leaders. Gwilym A. Price, president of Westinghouse, has said that "American business is now operating in a climate so hostile to enterprise that it is unable to obtain its capital requirements from the public." If we are to change this

situation it will require a major effort on the part of all of us.

Of course there is no substitute for performance. Before we can expect that the people at large will have full faith in business, we must be sure that we are running our own businesses so well, with proper regard for the public interest, that we deserve such confidence.

In the case of public utilities, this means furnishing the best possible service, at the lowest possible rates commensurate with fair profits, to all the people. It means selling effectively. It means leaving no voids for government to fill. You are doing this.

Being a Good Neighbor

But capable performance alone is not enough. We owe it to ourselves as businessmen to let the public know the value of our performance. This calls for alert and expert public relations. It means being a good neighbor—and letting the public know we are one.

To change metaphors, you can't polish a rotten apple, but you can take the wrapping off a sound one.

One of the most difficult aspects of this problem of deserving public confidence is the fact that some businessmen are guilty of the same derelictions they criticize in others. Some of them also have the "gimmies."

For instance, during the recent Senate debate on the Interior Department's appropriations bill, the Council of State Chambers of Commerce made the following embarrassing confession in one of its bulletins—

> "The Senate committee's generous treatment of the Interior Department is partly accounted for by the fact that its public hearings on the bill were the focal point of long daily parades of fellow Senators, Representatives, public power lobbyists and special-interest pressure groups (*including even a few business organizations, we regret to say*), all holding out the tin cup for Federal largesse for their pet projects."

Oppose Government Intervention

The moral is obvious. Businessmen must stop acquiescing in government intervention which doesn't seem to directly concern them. They will have to quit taking a handout from Uncle Sam with one hand, while they take a ***poke at bureaucrats*** with the other.

These then are the essentials of the program which—as I've said—have been developed from the experience and suggestions of many, including some of you here present.

Six "Musts"

Let me repeat them—

First, we have got to get informed. We must educate ourselves on the economics of the American system.

Second, we must recognize that many proposals for reforming the American economy stem from real human problems.

Third, we must be for right things, not merely against wrong things.

Fourth, we must spread the story of the American system, in terms everyone can understand and accept.

Fifth, we must take a more alert personal interest in government, and implement our interest by personal action.

And sixth, we must truly deserve the confidence of the people.

You no doubt have further ideas. I will welcome them, and I hope all of you will tell me here, or write me, any ideas I can add. I want to do the best job I can in carrying this story to others.

Along the way, I'd like to be able to report tangible progress, too. In this connection, I have a suggestion to make. If each of us, by the time the next EEI convention rolls around, makes it a point to put into practice the ideas I have collected, we'll start to show results. If each of us could report, nine months from now, that he had implemented these ideas with action on only nine occasions—one a month—we'd be making a real start.

What We Are Fighting For

One thing above all others is vital: Any effort to preserve "Our Way," or "Free Enterprise," or "Freedom," is of no importance if its objective is only to save "our" business, or "our" jobs, from nationalization, whether "our" business is railroads, or steel, or medicine, or electric power.

Saving a business—any business—from nationalization *is* important only because saving it helps to preserve freedom for *every* American citizen.

This point I repeat is vital. And our industry—or any other industry—is not going to fight encroachment successfully until we accept and practice this philosophy.

We, as businessmen, are never going to get public support to save "our" business, because "we" are being hurt or unfairly treated.

If we plead what seem to be our special interests, we will surely fail. This is true of the railroads, or doctors, or steelmakers, or bankers, or insurance men, or any other group whose particular field of business is being invaded by government and is being nationalized by stages.

We will get support from the man in the street only when we show him that after all it is he who is being hurt or unfairly treated.

Not until we show him that his savings and his children's future earnings that are today being taxed away from him will he be on "our" side—which is in reality "his" side—in the fight for a free America.

The Key to Freedom

A quarter century ago the late [illegible] D. Thompson, organizer and leader of the Public Ownership League of America, issued this manifesto—

> "... **The movement for public super-[illegible] becomes the most vital phase of the [illegible] ownership movement. The control of [illegible] power . . . will obviously carry with [illegible] control of the industries of the nation, the control of transportation, of mining, and [illegible] culture . . . It will also dominate and [illegible] mine very largely the domestic life [illegible] people . . . Electric power is the key [illegible] coming civliization . . .**"

All who believe in preserving the American Way of Life and Free Enterprise cannot let this key to freedom be wrested from them.

That would be bad—not because it is bad for you and me in the electric power business—but because it is bad for the people who place dependence on our business, whether they be customers, workers or investors. It is not the ox that is being gored—it is theirs. And it is up to us to make them see it.

Our industry—large though it is—is small in the world scheme of things.

But we have a far greater obligation than just to save our industry. It is our obligation to devote the best we have in us to help save our customers, our employees, our communities and our nation from the menace of expanding socialization.

This is Our Cause

This is our cause!

To this cause let us rally our friends and neighbors, in every community we serve.

For it will only be when we [illegible] individuals get the aid of a host of individuals that we can win this struggle which seems to be our part struggle but which in reality is [illegible] portantly theirs.

EEI Commercial Division Committees Plan Vigorous Campaigns to Develop Vast Market

By James T. Coatsworth
Commercial Director, Edison Electric Institute

EI's Commercial Division recognizes a challenge in President Lindseth's recent statement that every dollar spent on electric com- plant, customers spend four dol- for appliances and services.

n accepting this challenge, the Com- ial Division in expanding its activi- to help the electric companies sus- this huge market in their sales areas ooperation with appliance manufac- rs and dealers.

he nineteen committees making up Commercial Division, headed by RY RESTOFSKI, West Penn Power pany, Pittsburgh, Pa., Chairman of Commercial Division General Com- tee, are vigorously developing the ssary materials and techniques of s engineering and promotion to de- p this vast new market.

Active Load Building

he more than 300 members of these mittees are giving generously of their e in the planning and preparation romotional campaigns, market studies and reports. Special emphasis is being put on active load building campaigns geared to local markets.

C. A. STEVENS
Chairman of the Commercial Sales Section—Sales Manager, Electric Dept., Public Service Electric & Gas Co.

HARRY RESTOFSKI
Chairman of the Commercial Division General Committee—General Sales Manager, West Penn Power Co.

For operating efficiency, the Division is divided into four sections, one for each of the major markets—rural, commercial, residential and industrial. Each has its own chairman who, in cooperation with Mr. Restofski, supervises the activities of his section. In addition to the four sections, there are two independent committees, the Sales Personnel and Training Committee and the Wiring and Specifications Committee, which report directly to the Division Chairman.

COMMERCIAL SALES SECTION

The Commercial Sales Section under Chairman C. A. STEVENS of the Public Service Electric and Gas Company, Newark, N. J., will greatly expand its activities in the commercial cooking and lighting fields and will continue its work in the analysis and development of new uses of electricity in the commercial market.

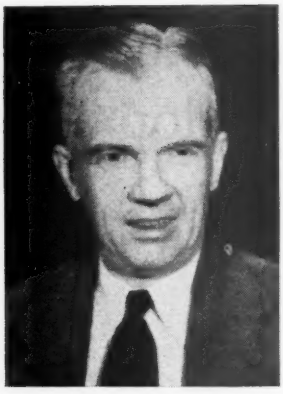
Commercial Cooking Committee

The Commercial Cooking Committee, headed by Chairman SHELLEY SANSBURY of the Union Electric Company of Missouri, St. Louis, Mo., is distributing a recently completed presentation book citing specific instances of successful promotions carried on in the commercial cooking field. The book also shows the vast untapped potential market existing in the field. As a follow-up on the presentation book, the committee will formulate plans for a program of promotional and advertising material including direct mail pieces, handouts and salesmen's aids.

Commercial Lighting Committee

The Commercial Lighting Committee, under Chairman C. D. HOLLISTER of New York Power and Light Corporation, Albany, N. Y., will continue to revise and expand the Planned Lighting Program for the commercial market. Many new mailing pieces for the office and store markets are now under consideration.

SHELLEY SANSBURY
Chairman of the Commercial Cooking Committee—Sales Engineer in Charge of Development and Training Division, Union Electric Co. of Missouri



C. D. HOLLISTER

Chairman of the Commercial Lighting Committee — Lighting Adviser, New York Power & Light Corp.

In addition to this, the committee is working on a simplified layout form which will be adaptable for stores, offices or industries. Included in the plans for the coming year are the preparation of articles on Commercial Lighting Committee activities for publication in the Commercial Sales Log, as well as other articles on commercial lighting applications and installation for placement in trade magazines. The committee will also encourage the use of manufacturer's specification sheets.

Market Development and Electrical Application Committee

The Market Development and Electrical Applications Committee under Chairman W. D. GENTRY of the Consolidated Gas Electric Light and Power Company of Baltimore, Baltimore, Md., has started to compile material for a booklet, "Analyses and Development of the Commercial Market," which will be an enlargement of the book previously issued in 1946. In addition, the Committee proposes the preparation of two market study reports: one dealing with restaurants and the other with commercial water heating. A questionnaire has also been proposed to ascertain what problems, if any, are being encountered in selling to chain store organizations.

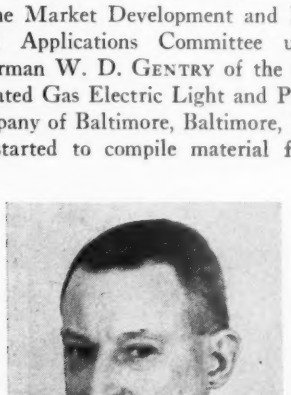
Street Lighting Coordination Committee

The Street Lighting Coordination Committee under Chairman G. E. KORTEN, Consumers Power Company, Jackson, Mich., is preparing a detailed report on Street Lighting activities based on answers received from a questionnaire which has been circulated throughout the industry.

The committee will continue the study of the possibilities of further standardization of street lighting equipment, in cooperation with manufacturers, technical societies and other trade associations.

G. E. KORTEN

Chairman of the Street Lighting Coordination Committee—Street Lighting Engineer, Consumers Power Co.

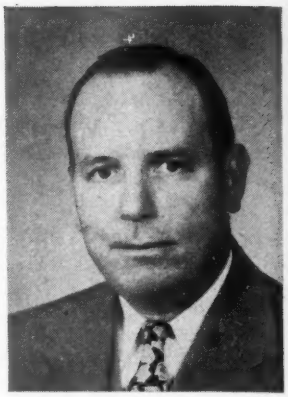


W. D. GENTRY

Chairman of the Market Development and Electrical Applications Committee — Consolidated Gas Electric Light and Power Co. of Baltimore

FARM SECTION

The Farm Section with J. C. CAHILL of The Detroit Edison Company, Detroit, Mich., serving as chairman, is planning a complete promotional program designed to increase the use of electricity on the farm. This year, in recognition of the important part being played by Rural Youth Organizations, the section has organized a Rural Youth Committee which will study the field from the electric company's point of view.



J. C. CAHILL

Chairman of the Farm Section—Farm Service Coordinator, The Detroit Edison Co.

Agricultural Development Committee

Under the direction of Chairma R. T. JONES, Pennsylvania Power an Light Company, Allentown, Pa., th Agricultural Development Committe will be primarily concerned with the de velopment of ways and means by whic the electric company may assist in crea ing new sources of income for the rur population. The committee plans to e courage the use of better agricultur practices which will result in the esta lishment of industries using farm pro ucts in manufacturing or processing.

The committee will also issue a h monthly report of selected farm adve tising produced by electric operatin companies.

Farm Utilization Committee

The Farm Utilization Committe with JOHN L. BURGAN of the Ne

R. T. JONES

Chairman of the Agricultural Development Committee—Farm Utilization, Pennsylvania Power & Light Co.

JOHN L. BURGAN
Chairman of the Farm Utilization Committee—Director of Rural Development, New York State Electric & Gas Corp.

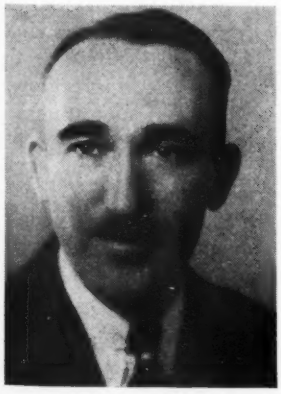
York State Electric & Gas Corporation, Ithaca, N. Y., as chairman, will continue to seek out new uses of electricity on the farm. It also intends to develop sales tools for electric companies with which all available uses of electricity may be brought to the attention of the farmer and applied to his needs.

The committee is planning a series of six sound-slide films dealing with the various applications of electricity on the farm. Also being considered are several pamphlets and booklets to promote the use of electrical equipment on the farm. The committee will also encourage the exchange of information within the industry for the improvement of general load building programs in farm areas.

Rural Youth Committee

The newly organized Rural Youth Committee, under the guidance of Chairman H. J. GALLAGHER, Consumers Power Company, Jackson, Mich., plans to make available to such major farm youth organizations as the 4-H Clubs, Future Farmers of America and Future Homemakers of America, information on electrical uses and applications in farm and home.

The committee's main task in its first year of operation will be to collect data from the companies who now have Rural Youth Programs in existence and to disseminate this information throughout the industry. The committee is also planning to compile a list of suggestions for organizing and carrying out a rural youth program.



H. J. GALLAGHER
Chairman of the Rural Youth Committee—General Farm Service Supervisor, Consumers Power Co.

R. G. ELY
Chairman of the Industrial Power and Heating Section—Assistant Manager, Power Sales, Public Service Electric & Gas Co.

INDUSTRIAL POWER AND HEATING SECTION

The Industrial Power and Heating Section with R. G. ELY of Public Service Electric and Gas Company, Newark, N. J., serving as chairman, is composed of three main committees and several subcommittees.

While the individual committees operate within specified fields of activities, the section meets as a whole so that the combined knowledge and experience of all the committee members may be employed in solving the major problems facing industrial power and heating sales engineers.

Competitive Service Committee

The Competitive Service Committee under Chairman G. S. YOUNG of Kansas City Power and Light Company, Kansas City, Mo., will collect, correlate and distribute for the benefit of the electric power industry, current factual data and information on (1) sources of competitive power supply, (2) methods used to meet and overcome such competition, (3) changes in processing procedure affecting heat balance in certain types of industries.

GLENN S. YOUNG
Chairman of the Competitive Service Committee—Manager, Power & Lighting Sales, Kansas City Power & Light Co.

The committee will also seek to determine the basic factors that affect competitive power situations, and from a study of these, formulate a plan for action toward the elimination of such factors at their source.

General Power and Heating Committee

The General Power and Heating Committee, headed by Chairman MAXWELL COLE, Philadelphia Electric Company, Philadelphia, Pa., has planned sev-

MAXWELL COLE
Chairman of the General Power and Heating Committee—Manager, Market Studies and Service Division, Philadelphia Electric Co.

eral projects for the four subcommittees which are now functioning. Active study of new applications of, and markets for, the industrial use of electricity; further study of the expanding field of electric heating; analysis of sales and sales promotion methods; and coordination of electric company and appliance manufacturer sales promotion programs are the most far-reaching and important projects.

Several sections of the Power Sales Manual are now being revised. In addition, the Electric Heating subcommittee will sponsor an Industrial Electric Heating School to be held March 13-17, 1950.

Industrial Lighting Committee

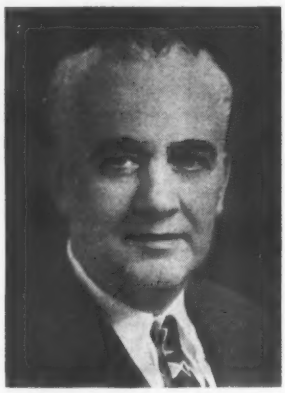
The Industrial Lighting Committee, under the direction of Chairman J. MASON GUILLORY, New Orleans Public

J. M. GUILLORY

Chairman of the Industrial Lighting Committee—Manager, Industrial and Commercial Division, New Orleans Public Service Inc.

Service Inc., New Orleans, La., is reviewing the industrial lighting materials contained in the Planned Lighting Program with the thought of revising some of the current material and issuing new items where advisable.

Studies will be made of the latest improvements in industrial lighting installations. In addition, members of the committee will serve with the American Standards Association in the study of standards for industrial protective lighting. Also on the committee's agenda for this year is a study of the market opportunities for better industrial lighting complete with case histories illustrating beneficial results.



H. A. STROUD

Chairman of the Residential Section—Promotion Manager, Monongahela Power Co.

RESIDENTIAL SECTION

The Residential Section under the direction of Chairman H. A. STROUD of Monongahela Power Company, Fairmont, W. Va., is aiming its efforts toward intensified promotion in the basic electric market, the home. The six committees in this section are now preparing promotional programs, surveys, market studies and sales tools to assist electric companies in expanding the use of electricity in the home. The section is also preparing a booklet stressing the advantages of living electrically.

Dealer Coordination Committee

The Dealer Coordination Committee with T. L. LOSBY of the Northern States Power Company, Minneapolis, Minn., serving as chairman, will develop and distribute releases to electric companies describing the promotion of the electric

T. L. LOSBY

Chairman of the Dealer Coordination Committee—Dealer Sales Promotion Dept., Northern States Power Co.

range, water heater, roaster, electric blanket, freezers, home laundry equipment, television sets, wall lamps and light bulbs. The committee will also undertake a study of available sales training materials and how they can best be used.

The committee is studying a program designed to gain dealer confidence in electric company promotional campaigns. The committee also proposes to investigate and report on a program of educational movies for children aimed at developing an increased market for electrical appliances.

Electric Kitchen and Laundry Committee

The efforts of the Electric Kitchen and Laundry Committee, headed by T. O. MCQUISTON of the Duquesne Light Company, Pittsburgh, Pa., will

T. O. MCQUISTON

Chairman of the Electric Kitchen and Laundry Committee—Manager of Residential Sales, Duquesne Light Co.

be directed toward the expansion of the highly successful All-Electric Kitchen Program which was introduced last spring. In answer to requests from the field, the committee is preparing a second Plan Book and new material which will enable the companies to expand their programs and increase their effectiveness. Plans are also being considered to unite the entire electric industry again in sponsoring an E-Day (Electric Day).

Electric Water Heating Committee

The Electric Water Heating Committee, with J. R. BRODERICK of Central Illinois Public Service Company, Marion, Ill., as chairman, is reviewing the possibilities for the preparation of sales promotional materials for use by electric

companies, dealers and all others interested in furthering the sales of electric water heaters. The committee will cooperate also with the Market Development and Commercial Water Heating Committees in the preparation of a water heating questionnaire.

The committee will continue to recommend standardization of manufacturing, plumbing and building codes and rates as they affect water heater sales. Also on the agenda is the continued study of problems with regard to system diversity and loading on substations and transmission systems in connection with the demands of water heaters. This work is a cooperative study to be carried on with the assistance of EEI Engineering Division's Transmission and Distribution Committee.

J. R. BRODERICK
Chairman of the Electric Water Heating Committee—Central Illinois Public Service Co.

Home Service Committee

The Home Service Committee under the leadership of MRS. MARIQUITA DYGERT of The Detroit Edison Company, Detroit, Mich., plans to conduct a survey of electric company home service departments in order to obtain information concerning policies, procedures and evaluation of such work. The committee plans to present the findings at the EEI Sales Conference in April, 1950. In addition the committee will continue to disseminate information in the Home Service field by means of the Home Service Exchange Bulletin and through regional conferences of home service directors.

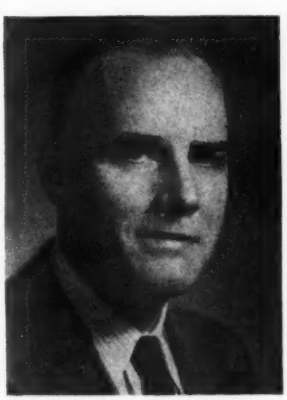
Several new booklets and leaflets are now being prepared on electric ranges and roasters, plus an outline of acceptable methods generally used in giving public appliance demonstrations.

MRS. MARIQUITA DYGERT
Chairman of the Home Service Committee — Supervisor, Home Service Division, The Detroit Edison Co.

Residential Lighting Committee

The Residential Lighting Committee, headed by F. E. CHENEY of the Philadelphia Electric Company, Philadelphia, Pa., is planning a complete study of all aspects of proposed residential lighting activities as part of a campaign to stimulate the Certified Lamp Manufacturers' Program. The committee then proposes to direct its efforts toward stimulating the program first, by outlining the proposed electric company activities as shown in the study and, secondly, by recommending a special broadened CLM Lighting Activity.

The committee will also continue to cooperate in the promotion of the Planned Lighting Program and assist in the development of new residential lighting materials as they are required.



F. E. CHENEY
Chairman of the Residential Lighting Committee—Manager, Appliance Division, Philadelphia Electric Co.

Television Committee

The Television Committee under the supervision of Chairman FRANK C. PESVEYC of Public Service Electric and Gas Company, Newark, N. J., is planning to conduct several studies in order to make available to the industry much needed information concerning the rapidly expanding television field. A study of the increased kwhr usage of the growing numbers of home television receivers has been proposed. A printed folder is also planned containing suggestions on proper lighting while viewing television.

FRANK C. PESVEYC
Chairman of the Television Committee — Sales Promotion Manager, Public Service Electric & Gas Co.

The committee also plans to issue at intervals a news letter that contains items of interest on television. Also under consideration is the preparation of a motion picture demonstrating the historic major inventions of Thomas A. Edison suitable for showing on television and before local school, service and civic groups.

SALES PERSONNEL AND TRAINING COMMITTEE

The Sales Personnel and Training Committee, headed by Chairman E. O. GEORGE of The Detroit Edison Company, Detroit, Mich., will direct most of its activities toward sales training aids. Because of the changing requirements for training salesmen, the development of new products and the creation of new teaching techniques, the commit-

tee will give immediate consideration to the revision of certain parts of the EEI Sales Training Course.

Also under consideration is the possibility of making available to local dealers, via television, the EEI Sales Training materials. The committee has arranged to obtain the opinions of the local dealers and television operators on the practicability of such a program.

WIRING AND SPECIFICATIONS COMMITTEE

The Wiring and Specifications Committee under the supervision of Chairman F. E. DAVIS of The Commonwealth & Southern Corporation, Jackson, Mich., will attempt to encourage the manufacturers of circuit breakers to set up a coordinated program to promote the use of circuit breakers in place of fuses in building wiring.

E. O. GEORGE

Chairman of the Sales Personnel and Training Committee — Assistant Commercial Manager, The Detroit Edison Co.

Two new sections of the Appliance Wiring Manual are planned for the coming year. One will cover the methods to be used for the electrical installation of laundry equipment of various kinds, while the second will deal with the wiring methods to be used for the installation of electric ranges.

A booklet covering the important advantages of three-wire branch circuits, and another which is intended to be used as a guide in compilation of service rule books for individual companies, are also being considered. Promotion of the widespread use of the National Electrical Code is another part of the activities planned by the committee for the coming year.

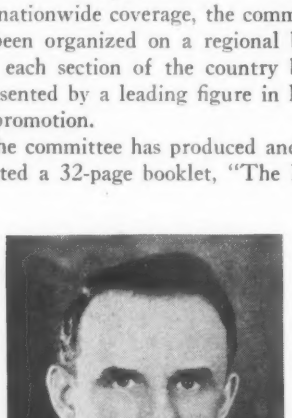
F. E. DAVIS

Chairman of the Wiring and Specifications Committee—Meter Engineer, The Commonwealth & Southern Corp.

National Promotion Committee Planned Lighting Program

The newly organized National Promotion Committee for the Planned Lighting Program is headed by Chairman J. S. SCHUCHERT of the Duquesne Light Company. The committee will serve as an active clearing house for successful Planned Lighting promotional and educational ideas used in all markets by the various branches of the electrical industry, including manufacturers, distributors, contractors, dealers and electric companies. In order to assure nationwide coverage, the committee has been organized on a regional basis, with each section of the country being represented by a leading figure in lighting promotion.

The committee has produced and distributed a 32-page booklet, "The Facts of Light," which illustrates many pr motional campaigns carried out succes fully with Planned Lighting materia The booklet also outlines the entire gro of Planned Lighting Sales Aids whic will be available in 1949-1950.

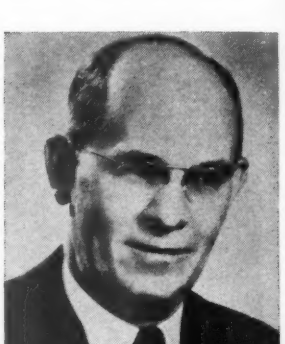


JOSEPH S. SCHUCHERT

Chairman of the National Promotion Committee, Planned Lighting Program—Manager of Commercial Sales, Duquesne Light Co.

Better Light-Better Sight Bureau

The Better Light-Better Sight Bu reau, oldest cooperative educationa agency in the electrical industry, is u der the direction of Chairman RALP P. WAGNER of the New York Power Light Corporation. Two committe are now functioning within the Bure organization: One, the Commercial an Industrial Education Committee, h J. S. SCHUCHERT of the Duquesne Ligh Company as its chairman, while th Home Lighting Committee is headed b



RALPH P. WAGNER

Chairman of the Better Light-Better Sight Bureau—Commercial Manager, New York Power & Light Corp.

J. M. STEDMAN of the Pennsylvan Power & Light Company.

The two committees constantly fo low the activities of electric utility com panies in the lighting educational fiel analyzing the need for materials whic would help to expand and intensify th programs, and then producing the items and distributing them to the ele tric companies.

The Bureau has recently released Kodachrome sound-slide film, "Educa ing in a Truer Light," which stresses th need for proper lighting in the school Also, as a follow-up to the successf elementary school program on the r lationship of light and sight, the Bure is preparing a similar program whic is intended primarily for science class in junior and senior high schools.

Prospects in Industrial Application of Atomic Energy

By Philip Sporn

President, American Gas and Electric Service Corporation and chairman of the Ad Hoc advisory committee to recommend ways to establish committee cooperation between electric power industry and the atomic energy commission

An address presented before the Annual Convention of the National Coal Association, New York, N. Y., October 7, 1949

SINCE the first application of nuclear fission was used to destroy Hiroshima, speculation as to what that event might mean to man has gone through the whole gamut of opinion, from overexhilarated enthusiasm to dispirited pessimism. Mr. Norman Cousins, editor of the *Saturday Review of Literature,* expresses the belief—typical of a great many others—that atomic energy permits man, for the first time, "to emancipate himself economically." In this view, the atom will make available "resources enough and power enough for all." Kapitza, the great Russian physicist, has said that atomic energy will not become a factor in peacetime application for 50 to 100 years. But he is definitely in the minority.

Effects of Atomic Power on Industry

Only three months ago the *Harvard Business Review* published a study which offers not only conjectures but also goes so far as to draw conclusions about the effects which atomic power may be expected to have on such specific industries as aluminum, iron and steel, rail transportation, manufacture of caustic soda, phosphate fertilizer, cement and brick, and flat glass.

The findings in the *Harvard Business Review* were not only extremely sketchy but the author of that article was most careful to stress their tentative character. The significance of this disclaimer can be more fully appreciated when you consider the nature of the assumptions on which the entire study is based. First, it estimates cost of electric energy generated by atomic power, at 4 to 4.5 mills per kilowatthour minimum and 6.5 to 7.5 mills as an intermediate range. These figures, in turn, are based upon assumptions of costs of a nuclear power plant of $140 per kilowatt as a minimum and $230 as an intermediate estimate. Since almost no facts are available from which to determine with any degree of accuracy what the cost of such a power plant will be, it is obvious that the foundation of the *Harvard Business Review* discussion is not very solid.

The earliest published statement on the cost of nuclear power appeared late in 1946 in a report by Dr. C. H. Thomas of Monsanto Chemical Company. That report put the cost of a 75,000 kilowatt plant at $25 million—$333 per kilowatt.

"A Megabuck Per Megawatt"

In March of this year Dr. Lawrence Hafstad, who had just taken office as Director of the Division of Reactor Development of the Atomic Energy Commission, said that "all of the big" reactors "run into lots of money." Dr. Hafstad seemed to think that the rough formula then in vogue around the Commission—"a megabuck per megawatt"—was about right.

Here, then, are responsible people using estimates which run all the way from $140 to $1,000 per kilowatt—a 7 to 1 range. For my own part I am not certain that even this range covers the outer limits on either the upper or the lower side. As a matter of fact, we do not know the sensible limits; estimates must be largely guesswork because we lack the essential facts for accurate engineering judgment.

Does this mean that we cannot arrive at a useful evaluation of the situation? Well, not quite. One thing is certain: If some day the guess at the lower limit is realized or bettered, then atomic power will have great social and economic significance. Even if we can't get the cost down to or near the lower limit, it can still have significance in places remote from economical sources of fuel or hydro. On the other hand, if costs should stay near or above the very high guesses, then atomic power is unlikely to have significance except for such applications as military craft where cost can be disregarded.

We know the general classes of engineering questions which will have to be answered before these cost imponderables can be resolved. We have been told a good deal in a general way about what is being done to get the answers. This knowledge and the various official predictions about the rate of development enable us to draw some fairly reliable conclusions about the probable timetable for atomic power. We cannot make very useful cost estimates now. We can tell now approximately when useful cost estimates will become possible.

All of this when put together in the perspective of our common knowledge about conventional power generation and utilization will make it possible for us to do considerably better than see the future through a mist of wonder, doubt, and dream.

Fissionable Material As Fuels

Uranium 235 and plutonium, insofar as they have any future industrial application will be used as fuels. This is most important. To the best of our knowledge, although it is perhaps possible to conceive such a phenomenon, there is no known basis for believing that direct conversion of fissionable material into electric energy can be attained. Instead, we will burn uranium or we will burn plutonium; only we will burn them with neutrons.

Let's follow up this highly over-simplified view of the process. Coal which you produce, we burn in our power plants by pulverizing it and mixing it with air, which supplies the oxygen. We burn this coal and in doing so, carry out a molecular chain reaction. We end up with hot gases and with ash. The hot gases are used to transfer their heat to water or steam inside the boiler, and this keeps the boiler tubes from burning up. The water or the steam in the boiler might be termed coolants.

Now, as the steam reaches the proper temperature — and in a modern boiler that might be anywhere from 950 to 1050F—it is used to drive a turbine.

Eventually the cooled hot gases are discharged through a stack. The machine in which we release this energy is called a boiler, and the machine in which, after several intermediate heat transfers, we convert it into electrical energy is called a turbogenerator. And the modern combination of boiler and turbine, operating at high pressures and high temperatures, is a most magnificent, intricate and beautifully performing piece of plant.

Nuclear Reactors

As I have already indicated, if uranium or plutonium are to be used in industry, it will also have to be as fuels and they will be burned by supplying them with neutrons. The products of the combustion will be heat and hot gases. The heat will be absorbed and the gases will be cooled by a coolant. The coolant, in turn, will be used either to generate steam to drive a steam turbine, or to heat a gas to drive a gas turbine. The cooled gases will be discharged through a stack to the atmosphere. The by-product of the burning of the uranium or plutonium will be an ash consisting of fission fragments. The machine in which all this is going to be carried on is known as a nuclear reactor. It is called that because it is the means by which the energy in the atomic nucleus is released through the process of fission.

The ash which we end up with in a pulverized fuel boiler presents a problem, but it is a problem which we know how to deal with effectively and economically. The ash developed in a nuclear reactor is highly radioactive and presents problems of infinite complexity and hazard for which satisfactory solutions are not yet known. The ash in a coal-fired boiler is by comparison a minor matter.

The gases discharged from the stack of a coal-fired boiler present difficulties but, again, these difficulties are simple in comparison with the problem of the radioactive gases emitted from a nuclear reactor.

Steam Turbine Efficiency

In the last twenty years we have materially improved the efficiency of the steam turbine cycle. We have raised pressures from about 1200 to present levels of 2100 to 2400 lb. per sq. in. We have made notable progress in raising temperatures, bringing them up from about 750 to 1050F. But it has taken us two decades to do it. One fact will give you an idea of the intricacy of this "conventional" steam turbogenerator: the modern boiler and turbine alone require some 27 different kinds of steel specifications, each particular kind tailored specifically to perform a particular part of the job.

The structural materials for a modern boiler producing steam at a temperature, now not higher than 1050F, are clearly defined and are reasonably available. No one, however, can tell as yet just what materials are needed or available to meet the peculiar requirements of a nuclear reactor. The material must have reasonably low neutron absorption—so as not to "quench" the fire. At the same time it must be able to stand up under untried conditions of temperature and rates of heat transfer. And it must resist essential changes despite bombardment of neutrons, gamma rays, beta rays and other products of the fission process which the nuclear reactor is designed to propagate.

"Breeder" Reactors

I have described a rough and superficial parallelism between the steam-turbogenerator and the reactor. In the case of the reactor, however, the problems which are yet to be solved impress me as very much more difficult than the by no means inconsiderable difficulties which beset the development of our modern steam generating plants. In connection with reactors there is also a special complication. A most vital factor in economics of nuclear power generation is the "breeder." Breeding is the process—theoretically attainable, actually still to be demonstrated —by which there is produced more fissionable material than is consumed in the operation of the reactor. The major obstacles standing in the way of developing breeder reactors are of an engineering nature and are concerned with basic conflicting requirements for high neutron economy and high power output for a given material investment. There are also acute chemical engineering problems associated with the treatment of partly depleted fuel. These are problems which confront the development of all reactors —except that for breeders they are even more difficult.

But there is one caution that we must always keep in mind: however perplexing the problems of the nuclear reactor may seem, the hindsight of 1969 may well disclose to us that they were in fact simpler than they now appear.

What, you will ask at this point, is being done to solve these problems which must be disposed of as a prelude to a industrial application of atomic energy

Examined from a cost standpoi alone, the effort which is being ma shows up as formidable: in the fis year 1948 obligations amounting to $ million were entered into by the Atom Energy Commission on account of t reactor development program. The co responding obligations for the fiscal ye 1949 are expected to reach a figure $61 million, and some weeks ago t Congress authorized something ov $100 million for the fiscal year 1950. total of well over $200 million will ha been committed for the three years 19 to 1950 alone.

AEC Reactor Program

Thus, following an initial period some hesitation and seeming confusi the Atomic Energy Commission has n embarked on a carefully thought out p gram of reactor development. But, you will shortly note, the reactors wh are to be constructed under this progr are all designed for experimental p poses only. None of them is intended be capable of supplying power to dr an aeroplane or a ship, or the power light a city. Reactors other than th planned for the next few years will h to be built before such results will be tainable. But if that goal is ever to attained, these experimental projects the necessary point of beginning.

Broad, Ambitious Development Progra

The program of development now der way is ambitious and broad. As scribed during recent months by lead officials of the Atomic Energy Comm sion, it consists of four reactors:

1. An experimental reactor, inten to give information on the beha of materials so that larger and m powerful special purpose reac may ultimately be built.
2. A land-based prototype of a actor to be used in propelling na vessels. It will be designed spe cally and solely for the purpos producing large amounts of h under conditions which will per conversion to propulsive power.
3. A single-purpose experimental actor, designed specifically to information about the bree process.
4. Finally, the Knolls Atomic Po Laboratory Reactor. This re is intended to produce a really

nificant amount of electric power. At the same time, it is hoped that it will be able to demonstrate at least partial success in breeding.

The program, then, is designed, first to provide for research in relation to materials. As I have already indicated, our lack of knowledge of materials and material properties is a serious limiting factor in the development of power reactors. This program is designed to remove that limitation. It is designed also to attack the "breeder" problem. And at the same time it is designed to take the first steps of producing a significant amount of electric power, although at what cost no one can as yet foretell.

Industrial Consequences

Here then is an energetic, well planned and coordinated effort—with over $200 million already appropriated to it—to solve the technological problems which stand in the way of industrial application of atomic energy. With an effort of that magnitude in progress it becomes especially relevant to consider some of the industrial consequences in the event the program of research and development should be rewarded with a measure of success.

In the event that cheaper electric power can be achieved through the use of atomic energy, several industries might well be stimulated. Examples are: reduction of magnesium and aluminum, refining of copper, production of cement, chlorine and caustic soda, electric furnace operations like the production of graphite, carborundum, calcium carbide, phosphoric acid, ferroalloys and electric steel. All these operations are characterized by a high figure of kilowatthours per week per worker and a relatively low figure of wages per kilowatthour used.

Power Costs In Industry

To put it another way, power costs in these industries represent a substantial percentage of total cost—as contrasted with a relatively minor percentage in most industries—so that any appreciable reduction in power costs will materially reduce cost of product. The resultant application or use is bound to be stimulated.

Thus, in these industries we have a range of kilowatthours per week per worker running from a low of 2200 for cement and electric steel to a high of 8900 in the case of ferroalloys, and 9200 in the case of phosphoric acid. In these same industries we have a range of workers' wages per kilowatthours used from a high of 3 cents per kilowatthour, in the case of cement, to a low of 0.7 mills, in the case of ferroalloys and phosphoric acid. Contrast that with figures of approximately 50 kilowatthours per week per worker and $1.10 of wages per kilowatthour used for such industries as electrical machinery, machine shop operations, and furniture manufacture.

The industries then that could benefit most from any appreciable reductions in the cost of electric energy are these which involve operations with high electrical energy consumption per worker employed. The displacement of other forms of energy by atomic energy in such industries will be indirect—atomic fuel will displace coal, or gas, or oil in new plants, or in rebuilt old plants; or white coal in hydro plants that might otherwise be built. Some new electric processes might also be developed if atomic power is cheap enough: electric melting of general-purpose glass, for example; or direct reduction of iron by electric processes; certain kiln operations might be electrified.

Major Economic Factors

Whether or not atomic power will stimulate these existing processes or encourage the development of such new ones will depend on cost. Now what are the major economic factors in a nuclear reactor as an electric power producer? You will recall that in a nuclear reactor, we burn uranium or plutonium with neutrons, and I am going to assume that "breeding" has been successfully developed. When that has been accomplished, one pound of ordinary uranium will be able to do the work of 1500 tons of 13,000-Btu-per-lb coal. Under these conditions, the direct fuel cost will approach the cost of white coal—almost zero.

If the cost of generating power were dependent only on the price of fuel, here would be a power Utopia, indeed. But the processing of the fuel will involve elaborate and therefore relatively expensive chemical operations. And so, the capital costs of the chemical plant, the nuclear reactor and the steam and electrical portions of the complete atomic power plant are bound to be the dominant portions of the cost of electrical energy at the point of generation.

Let us take a look at the cost of power at the switchboard of a coal-fired modern steam electric plant. Again I shall have to risk possible misinterpretation, and simplify.

If you start out with a modern steam plant burning pulverized coal, the range in capital costs is perhaps $150 to $200 per kilowatt. The range in fuel costs lies, say, between 10 cents and 40 cents per million Btu. The practical range in intensity of use probably lies between 50 and 68.5 per cent plant factor (500 hours' use of capacity per month). Under these conditions, and using a value for cost of money of 6 per cent, and allowing for depreciation and local and federal taxes, the range in total costs of energy at the switchboard is between 5.5 and 12.0 mills—a range of 2.2 to 1.

Range of Nuclear Plant Costs

For the nuclear plant, using the range of capital costs discussed at the beginning of this talk—$140 to $1,000 per kilowatt—the range in *fixed costs of plant,* using the same cost of money, but a higher depreciation rate, because of the more rapid obsolescence always present in a new technology, and the same taxes, would be between 3.9 and 38 mills—a range of almost 10 to 1. This wide range of estimates can't be narrowed until the present reactor program develops the data we must have for more informed engineering estimates. The total cost of electric energy at the switchboard will have to include some operating and maintenance costs and some value for cost of fuel. At best, it may be substantially zero. But the actual costs of fuel can likewise not be estimated with any accuracy until the breeding phase of the present reactor program is more fully developed.

Two Unknown Factors

These two unknown factors constitute the principal barrier to any sound engineering appraisal of the economics of nuclear fuel utilization: lack of engineering knowledge on many phases of reactor design, construction and operation—which makes it impossible to estimate the capital costs of a reactor plant; and lack of knowledge and practicability of breeding—which makes it impossible to estimate the fuel costs.

What course ought the coal industry to follow in this situation? As an outsider, I would not be so bold as to attempt an answer to that question but perhaps I can offer an analysis of the problem without appearing rash.

One way of looking at it is this: If

nuclear power has such an array of formidable technical hurdles to take and if costs are so uncertain, why worry, why not forget about the entire atomic business—at least for some time to come? I don't believe, however, that any responsible person in the coal industry will forget about atomic energy, if for no other reason than that the search for peacetime application is being pressed so aggressively and will continue to be.

A Pandora's Box

We have here a Pandora's box. I am sure you all recall the Promethean fable in which Pandora, the first woman made by the gods, having opened the box containing all the human ills then known, couldn't close it before this multitude of plagues escaped. But there remained one thing at the bottom of the box and that was Hope. So also with nuclear energy. When the energy of the nucleus was released, it, too, brought with it a host of plagues—certainly no cities in the world were ever more plagued than were Hiroshima and Nagasaki. But it, too, left behind it Hope—in fact, a number of hopes—and among these the hope of a more universally available, more easily portable and more economical energy for the use of man. The search for it is bound to go on.

Then, is the reverse course the right one? If the coal industry has to seriously consider the possibility of atomic energy, how it is to handle the problems of expansion, acquisition of new reserves, building of new organizations? Should it consider giving up and preparing for the inevitable? Can that be the right course?

Expansion in Fuel Burning Plant

Perhaps the course which the electric power industry has followed will be illuminating. Beginning in 1947 the industry started on a five-year $9 billion expansion program of its facilities, unprecedented in its history, or for that matter in the history of any other industry in this country. In the three-year period 1949-1951 alone, some 18,125,000 kw of new generating capacity will be completed and 15,045,000 of that—83 per cent—is fuel-burning capacity, most of that coal.

In working out that program, larger units, higher pressures, higher temperatures and new records for efficiency will be established. The possibility that nuclear reactors will become practical and economical devices has been reckoned with; but it has had no retarding effect on expansion plans based on the most modern technology possible today.

Future For Nuclear Fuel

There appears to be every reason for belief that some day nuclear fuel will be burned in industry. But how long will it take before that actually comes about? Here you need to clearly distinguish between different possible uses. There may be, on the one hand, some limited or special application, such as propulsion of naval vessels, or utilization in areas remote from an economical supply of coal or oil. Or there may be broad applications in industry, with nuclear fuel as a direct competitor of present standard fuels — particularly oil and coal. But even on this qualified basis, the answer to this question is obviously tied up with the reactor development program under way. Let's see what some of those closely associated with the effort say.

A little over a year ago the A.E.C.'s General Advisory Committee, which includes such figures as Conant, Oppenheimer, Fermi and Rabi, had this to say:

"If unfavorable assumptions are made about the cost of uranium and the technical practicability of breeding, the result is that atomic power would not compete with coal power in the United States except in regions where the cost of transportation of the fuel from the mine is the determining factor, or under other special conditions where the small bulk and weight of the uranium fuel are particularly valuable. On the other hand, if favorable assumptions are made about the cost of uranium and the technical practicability of breeding, the ultimate capacity may become comparable to and even larger than the present coal industry and will operate at a lower cost, at least as far as fuel expenditure is concerned. At the present time, sufficient knowledge does not exist to make a definite choice between these two alternative possibilities. It should be pointed out that, in either case, the cost of a nuclear-fuel power plant will be substantially greater than that of a coal-burning plant of similar capacity."

Then the Committee volunteered the following as to a timetable:

"Even on the assumption of a most favorable and rapid technical development along these lines, a word of caution is needed as to the time scale. We do not see how it would be possible under the most favorable circumstances to have any considerable portion of the present power supply of the world replaced by nuclear fuel before the expiration of 20 years."

Some months later this projection was further amplified by Dr. Robert F. Bacher, then a member of the U. S. Atomic Energy Commission, in a speech before the American Academy of Arts and Sciences:

"The present reactor development program should tell us whether it is technically feasible in a small-scale plant to produce electrical energy from a nuclear reactor. If the results are favorable, it will then be possible to design a larger scale reactor for the development of electrical energy and in the course of this development it should become clear whether this possibility is economically feasible. Within eight to ten years such a unit should be in operation. But for nuclear energy to have any significant impact upon the country as a source of electrical energy would take much longer, even granting economic feasibility.

"In view of the meagerness of definite information about the long-range future of nuclear reactors, I suppose that each of us is eligible to some opinion. My own feeling is that the possibilities for benefit to man from this development of atomic energy are very great."

"Not Around the Corner"

And in July appearing before the Congressional Joint Committee, Dr. Enrico Fermi, who played such an important role in the wartime development of the atomic bomb, replied to a question as to whether atomic energy was around the corner:

"The thing is not around the corner. Some limited experimental application may be possible not far in the future. Perhaps some naval applications may come forth in the not too distant future, but if by 'competitive' power you mean something that could be comparable to coal or oil, I believe that production of such huge amounts of power, if they ever will be produced are certainly very far in the future.

"On the other hand, perhaps, one should not take necessarily a too pessimistic view about this situation either. There are basic possibilities; I find it really extremely difficult to strike the right note between optimism and pessimism.

"You see, we talk of a matter certainly of 15 or 20 years. Now, who is the prophet who can see things at that distance? Atomic power may ultimately develop not into a competition but, rather, in supplementation of conventional fuels.

"I believe that it would be a great disservice to engender unjustifiable hopes—I believe that it is very desirable that the public should stop thinking that atomic power is around the corner, because if they do so they are in for a disillusionment, and the public has a right to know and certainly should get a reasonable perspective of the program.

"If atomic power will develop at all into a very important industrial fact, it will do so only in a very many years. That is very clear to me.

"There might be some interesting spotty applications to this or that field to which the

(*Continued on page* 378)

The Critical Years Ahead

By H. P. Liversidge

Chairman of the Board, Philadelphia Electric Company

An address before the Forty-second Annual Meeting and Industry Conference of the Pennsylvania Electric Association, Philadelphia, Pa., September 20, 1949

THE achievements of the Pennsylvania Electric Association in behalf of the electric utility industry during the two years since it last convened here have been noteworthy in many respects. Nevertheless, this is not the time for the electric light and power companies to rest on their laurels, but to forge ahead. The utility industry is second to none in its contributions to industrial progress and the welfare of our people. Its labor relations, by and large, have not been marked by the disastrous conflicts which have so crippled many other vital industries, with the consequent disruption of the economy of the communities in which they are located.

It would be a gross mistake if the Association were to become complacent at this crucial point in the history of the electric light and power industry, and it, therefore, is doubly necessary that the Association not only continue to have the active support of its membership, but that its members in turn enlist public support of the industry's endeavors to uphold the American Way of doing business. I believe all of you will agree it is increasingly important that business-managed, tax-paying utilities — a symbol of our private enterprise system —enjoy the confidence of the public in every strata of society.

Continued Stability Expected

Present business trends indicate that the electric utilities will continue to enjoy a marked degree of stability during the coming year. The production gain for 1949 is estimated at approximately 10 per cent for the industry, and there is reason to expect that this gain will be carried through 1950. During 1949, the nation's utilities will have spent approximately $2,300,000,000 for their vast expansion and improvement projects, and in 1950 an estimated $2,200,000,000 more will be expended on such developments. On this basis it may with reason be concluded that the utility industry's expansion program accounts for about 20 per cent of the country's total construction activity.

From a casual observation, therefore, it would seem logical that we can look forward with every confidence to a continuance of growth.

You may well ask, therefore, why I have selected the title "The Critical Years Ahead." Why should this be—what is there in our past record to create doubt for the future?

Double Power Output Each Decade

An overall glance at the growth in national demand for additional energy will show that since 1920 there has been an approximate doubling each ten years. While we have another year to reach the decade 1940-1950, every indication points to the same rate of increase or better. So we may conclude that it cannot be because of lack of expanding business, lack of investor support, or lack of technical ability to efficiently solve the problems arising from greater and greater capacities to meet the steadily growing demand.

As I view the situation, none of these factors will have any retarding effect on the development of our near future. Our problem is not of our making. It is by far more grave than anything thus far encountered in our little more than a half century of growth. It is the increasing evidence on all sides of us that the seeds of Federal ownership which started their growth about 1920—have today reached such proportions and have acquired such support—both inside and outside the political arena—that one is prompted to ask how soon shall our entire industry be engulfed.

Generally speaking one would think that any industry which has such a brilliant record of accomplishment and which contributes so much to the overall prosperity of the nation would command universal public acceptance. However, we in the industry must face the fact that this does not appear to be the case.

The discouraging divergence of public opinion regarding utilities, particularly during the past decade, has been due in large measure to a grand design foisted on the people of America by articulate spokesmen for statism. Their untiring efforts have successfully influenced many millions of people into believing that government ownership and government direction can do a far better job than can be done under private ownership. It is this insidious form of benevolent despotism that constitutes a grave menace to the American tradition of free enterprise.

Just how real this menace is was re-emphasized recently when the proponents of public power negotiated further inroads into the vital Northwest area through a process of condemnation proceedings against the Puget Sound Power and Light Company. The sale called for the purchase of a $16,500,000 part of the property, and it is anticipated that the advocates of public power will absorb the remainder of the $144,000,000 system by the end of the year.

As you all know this is not an isolated case, it has happened before, and it will happen again if we fail to heed the warning sounded by their president, who, in commenting on the transaction, said, "It seems there is no effective way to stop the onward march of the public power forces into the utility field. Sale of this property was made under the gun of condemnation proceedings."

It is the growth of this doctrine that the entire business-managed utility industry must contend with if it is not to be intimidated, or actually driven out of existence.

A Taxpayer's Problem

The philosophy of public power fundamentally is a taxpayer's problem which, because of its socialistic characteristics, is vitally important to every American.

The public will learn—too late perhaps—that it's their money that is creating this gigantic Federal monopoly. True it is their money that is invested in the so-called private power industry, but with one great difference — the money taken from the public in taxes is spent not for the resultant benefit equally of all taxpayers but is allocated

to such areas, and for such uses as the bureaucrats choose. On the other hand, when private capital from the same public is invested—used as the stockholder may elect—it contributes its full share of taxes besides earning something for the owner.

Public Power Propaganda

A great many people in every segment of society, admittedly, are proponents of the public power theory simply because they have been beguiled by the seemingly altruistic aspects of such projects. It is no wonder, for they have been misled by a propaganda campaign unrivaled in the history of a traditionally free nation.

Impartial observers estimate that millions of dollars of public funds have been spent in recent years to sell Americans on the idea that the state can do a job better, and a cheaper one, than private enterprise. Facts will disprove such contentions. Does a government bureaucracy function more efficiently than a business-managed taxpaying enterprise? Is the government really doing a job at less expense when its overall costs are levied on the public in the form of taxes? The obvious answer to both questions, based on facts, not theories, is "no."

Lamentably, in the past decade, the government has passed much chameleon-like legislation, particularly measures concerning soil reclamation projects. It is not surprising, then, to find that the importance of many of these reclamation developments suddenly become subordinate to their value as hydroelectric projects. The duplicity is made apparent by the flexibility and latitude of so-called reclamation bills when they are introduced to Congress.

Political Shell Game

It is tantamount to a political shell game when the principal objective of legislation appears to be what it is not. Furthermore, it points up the absolute necessity for clear-cut legislative proposals.

The unprecedented intervention of government into the field of the electric utility business far and beyond any point that can be justified as necessary to the common good provides a tragic proving ground in the contest between the proponents of the American concept of private enterprise, and the advocates of quasi-socialism.

Government regulations are one thing, but government dictatorship of any one industry clearly portends eventual government subjugation of all critical industries. Surely, there is cause for alarm when the pattern is so apparent. The whole fabric of socialism is woven through the gradual deprivation of human rights, including that of the individual, singly or collectively, to engage in business.

One cannot afford to minimize the consequences of government ownership and control of the business life of our country without jeopardizing the very foundation of our governmental system. It is the extent of such controls which inevitably determines the type of government under which people live. It makes little difference what name it assumes. It was called National Socialism in Germany, and Fascism in Italy. In the Soviet Union it is called Communism, and they are calling it Socialism in England.

England, as we all know, was the country most recently to capitulate to the philosophy of state-ownership. The nationalization of its mines, transportation, health services, and utilities is an unhappy reality which few Britons relish despite the desperate claims of the so-called Labor Government.

England's Nationalized Utilities in the Red

The brief history of the British Electrical Authority under the Minister of Fuel and Power provides a particularly revealing example of state ownership in action, and should prove an object lesson to the public power advocates in this country. Although the government took over Britain's electric utilities in April, 1948, at only 60 to 65 per cent of their acknowledged worth, the system, nevertheless, is already running in the red notwithstanding a 20 per cent boost in rates effected within three months of government ownership.

Can it ever be said then that public power "pays" when it is the product of government financing from funds provided by the taxpayers, and its losses are made up by a systematic program of deficit financing, the burden of which also falls on the taxpayers.

For years, during the early period of TVA development, we heard the popular slogan "yardstick" used in describing the need for TVA's creation. Well, even an idiot wouldn't be fooled by that so-called unit of measurement today. Now, however, we are bombarded with the modernized slogan of "cheap power" —and it is cheap—no one can deny this, but cheap only to the people in the area served—and they aren't paying what the energy costs. The taxpayers in the rest of the nation, whether they know it or not, whether they like it or not, are forced to make up the difference.

Socialism Step by Step

We know from the lessons of history that the road to Socialism, and Communism is a step-by-step process. The first characteristic is usually a well planned attack against the most vulnerable industry. This process is repeated against other vital industries until, at length, the whole economy is subject to the whims of the leaders of a super state. The gradual process of bringing industry under the yoke of Socialism is reflected by England which, between the years 1946 and 1948, successively nationalized: the Bank of England, the coal mining industry, aviation, transportation, utilities, insurance, and health services.

It is no secret that the exponents of Socialism expect America to follow England in this process. In fact Britain's Foreign Secretary, Ernest Bevin, as recently as April 15, flatly predicted, "The United States will follow Britain's example and embrace Socialism." He added fuel to the fire again on July 18, when, according to the Associated Press, Mr. Bevin speaking in the House of Commons said that the United States was "as much a welfare state as we are, only it is in a different form."

However critical the years ahead may be, and despite Mr. Bevin's dark predictions about the future of government in the United States, I am confident that Americans, in the long run, are not of a mind to forfeit their heritage of freedom.

Public Power In Nebraska

Nevertheless, it is a fact, one state, Nebraska, already is totally supplied by Public Power. Obviously then, it is not so much a question of a threat in the remote future. The threat is with us and unless the industry faces that fact now it will have no future, at least no future which vaguely resembles a business-owned, business-managed operation.

The exponents of public power are no longer voices crying in the wilderness. They are avowed advocates of a grand design which is alien to the American concept of government. These apostles

of pseudo liberalism, and they are well known, are sowing the seeds of state ownership, and unless the citizens of every community throughout the land help stamp it out, America can reap the whirlwind—Socialism.

It is for that reason that I want to emphasize the fact that the situation which confronts the electric light and power industry should also, and properly, be the concern of all industry, all professions, all groups which in any way identify their personal and business welfare with the preservation of the private enterprise system of government.

Danger Signal For All Business

The threat of nationalization is not the exclusive problem of the utilities. The steel industry was threatened. The medical profession is currently under attack. And should any one group fall to nationalization, we may well expect others to follow. Government intervention into the utility field sounds the danger signal to all business.

That is the problem which all Americans face. The utilities alone cannot hope to stem the tide. They must be joined in the crusade by other industries, and by patriotic men and women in all walks of life, irrespective of their political persuasions. I am chagrined at the lack of understanding, and apathy on the part of the public concerning the vital issues before the nation today. My memory does not serve to recall any time when the need for widespread education on the simple, fundamental issues of Americanism was so urgent. I believe that such education through our schools, and in our homes, is a prime necessity if the people of the country are to have a proper understanding of what is going on in America today.

Recently a Senate Bill, S.1645 to be exact, was brought to my attention. It proposes the establishment of a Columbia Valley Administration which would enjoy various unusual prerogatives not incorporated in similar legislative proposals in the past. For example: paragraph four notes that, "the doctrine of beneficial consumptive use of water shall be recognized, and"—note this—"in the event of any conflict between the purposes for which the waters of a region may be used, preference shall be given to atomic energy requirements for national defense and to domestic, irrigation, mining, and industrial purposes." It impresses me as a rather radical innovation in water law because, at the discretion of the Administration's 3-man, politically appointed board of directors, atomic energy requirements take precedence over drinking water, irrigation and all other uses.

Then too, one reads that—"All members of the Board shall be persons who profess a belief in the feasibility and wisdom of this Act." In plain English, it means that to be eligible for appointment as a CVA director, an American citizen must subscribe to a belief in the philosophy of government by government monopoly. The crowning touch contained in this proposal, however, lies in the fact that the CVA's 3-man board would absolutely control the future supply of electricity in the Pacific Northwest. Under the terms of the Bill, it can use its dominant contract powers now or hereafter conferred upon it.

We, in Pennsylvania, have thus far been fortunate insofar as government encroachment into our territory is concerned. A short-sighted observer might ask what we have to fear here. To be sure we have heard nothing yet about a Susquehanna River Authority. But can you not imagine what the situation here would be now had we not developed Holtwood, Conowingo, and Safe Harbor? With Conowingo but 75 miles from Capitol Hill in Washington, you can rest assured a coalition of public power minded legislators would long since have decided a Susquehanna River Authority should be developed near Washington where they could keep an eye on it.

Yes, there are ahead of us critical years—years that will determine the pattern for the future. How to stem this apparent headlong plunge to statism—how to arouse the earnest support of every sincere American—how to make the present generation join hands with those who are face to face with immediate programs of Federal ownership? These questions must be given our utmost attention. Thus we have before us a responsibility increasing as time moves on. We must act in unison and on the national level—we must see to it that there is a solidarity of support which will lay the true facts before those committees and individuals who are our representatives in the promulgation of laws and policies affecting the free exercise of our rights under the Constitution.

Then too on the level of the individual company we must live up to our responsibility to the public we serve, both in the matter of rates and the type of service.

In planning for the critical years ahead we must never lose sight of the necessity of improving our basic service in every detail. Personalized service should be the basis of the future well being of the electric light and power industry. It also should be the solid foundation upon which we must build in order that we may enjoy the kind of public relations that makes for a more concrete understanding of the great issues that will ultimately affect all of us.

In the final analysis it is in the arena of public opinion that the problems will be finally resolved. I am firmly convinced that facts are our most potent weapons in the war of ideas, and that if we use them wisely then the business-managed, taxpaying electric utility industry in these United States may not only weather the onslaught of those whose one obsession seems to be total nationalization, but move forward to greater contributions to the social and economic life of our nation.

Quoting from a recent statement by Dean Russell, "As harsh as it may sound, private utilities everywhere must continue to resist both the threats and promises of the advocates of government power production. This must be done if freedom is to survive in America."

E. R. Crofts

EDGAR R. CROFTS, 61, operating vice president and a director of Rochester Gas and Electric Corp. and associated with that utility for more than 33 years, died on September 9 after an illness of five weeks.

Mr. Crofts was born in England and was brought to this country at an early age. He graduated from Cornell in 1910 and was employed for several years in New York City in construction work. In 1916 he went to Rochester Gas & Electric as a design engineer in maintenance and later became head of that department. Posts as purchasing agent, chief engineer and general superintendent of the electrical department followed until he was appointed assistant vice president. In 1944 he was made a vice president and in 1946 was placed in charge of all electric, gas and steam operations of the company.

He was a past chairman of the EEI Prime Movers Committee and member of many national and local organizations.

Glen R. Trumbull, Better Light-Better Sight Bureau Manager, Retires

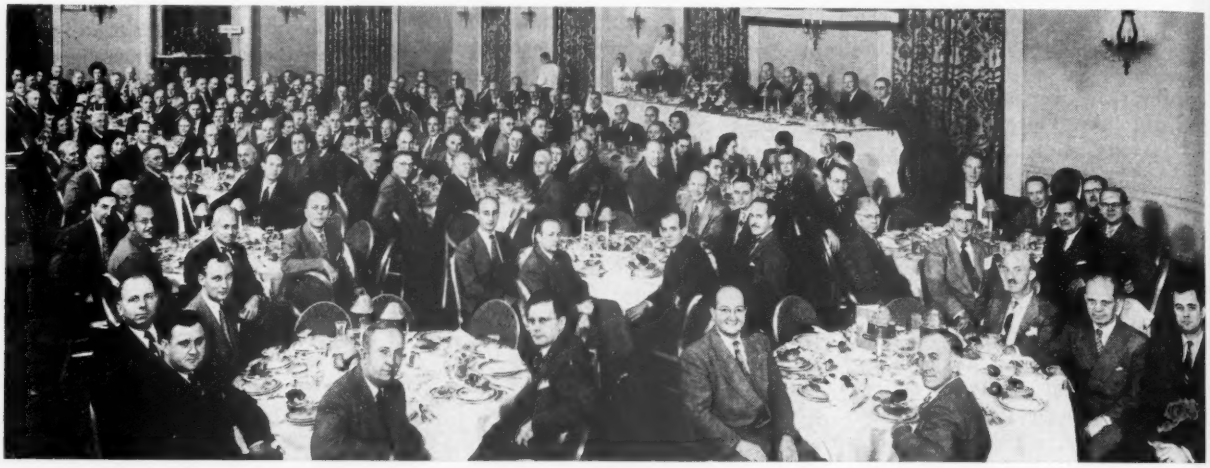
THE retirement of Glen R. Trumbull, Manager of the Better Light-Better Sight Bureau for the past 15 years, has been announced by Ralph P. Wagner, Bureau Chairman.

At a dinner honoring Mr. Trumbull on Oct. 13 in New York City, attended by many leaders of the electric light and power industry, Merrill E. Skinner, vice president of the Union Electric Company of Missouri, St. Louis, Mo., declared: "Glen Trumbull's name and that of the Better Light-Better Sight Bureau have been inseparable. . . . More than any other one person he deserves credit for the Bureau's fifteen-year record—he deserves our applause for his tireless efforts to encourage the industry and the public to understand the need of Better Light for Better Sight." George E. Whitwell, vice president in charge of sales, Philadelphia Electric Co., Philadelphia, Pa., also spoke in tribute to Mr. Trumbull.

Born in Norwalk, Ohio, in 1884, Mr. Trumbull attended Ohio State University. He entered the electrical industry in 1909, with Henry L. Doherty & Company, serving as salesman and commercial manager for several subsidiary companies.

Promoted to Assistant General Commercial Manager of the Doherty company in 1915, Mr. Trumbull remained in this post until 1922. He then joined the A. E. Fitkin Company, as General Commercial Manager. From 1930 to 1932 he was with American & Foreign Power Company, an Electric Bond & Share subsidiary.

In 1932, Mr. Trumbull was appointed Manager of the National Electric Cookery Council, a cooperative organization of electric utilities and appliance manufacturers. He became Manager of the Better Light-Better Sight Bureau upon its organization in 1934.



GLEN R. TRUMBULL, retiring manager of the Better Light-Better Sight Bureau, honored by fellow workers and associates at a dinner held in the Hotel Commodore, New York City, on October 13. The occasion also marked the 15th anniversary of the Bureau.

Prospects in Industrial Application of Atomic Energy

(*Continued from page* 374)

special features of this form of power are particularly suited. But before atomic power becomes a really large-scale affair it will take a long time."

Let me, in the light of all the expert judgment above, but in view of the fact that a good many of the problems to be solved are engineering problems, give you my own guess as to the timetable. It seems to me that with all the technical problems still to be solved, the first and purely experimental phase of that program will take from three to five years. Within perhaps three to five years after that—that means, then, in from six to ten years from now—we may have a reactor producing electric power. Four to five years after that—that is, ten to fifteen years hence—we may have some commercial generation of nuclear power. But I anticipate in that time it will be commercial only in the sense that it will be operating more or less regularly day in and day out.

The recent announcement that Russia had produced "an atomic explosion" could conceivably affect this timetable. If it results in a newly enlarged emphasis on the military aspects of atomic energy, it would doubtlessly result in lengthening these time intervals by substantial amounts. On the other hand, we have been assured that all emphasis desirable and perhaps possible has already been placed on the production of materials for atomic weapons. In the light of the above, and judging by the past good sense of those charged with formulation of policy on atomic energy development, I would expect the Russian news to have no appreciable effect on the peacetime exploration program.

As to the economic factor—when will nuclear fuel become a significant competitor of coal—please remember the two unknown factors that I have talked about. If these imponderables can be resolved favorably for nuclear power, I cannot imagine it happening any earlier than in fifteen to twenty, or twenty-five years. Perhaps it will take even a longer time. Even then, the degree of competition will depend not only on how successful the nuclear power program turns out—but also on how successfully the coal industry can meet the ever-present challenge of advancing its own technology and discharging its social-economic responsibility.

Michigan Celebrates Consumers Power Company's Connection of 100,000th Farm Customer

Rain Overhead and Mud Underfoot Fails to Dampen Ceremonies at the Fredericks' Farm

(*From the* Jackson Citizen Patriot *of October 7, 1949*)

"MORE than 2000 persons braved rain overhead and mud underfoot Thursday to help the Consumers Power Co. celebrate connection of electrical service to its 100,000th farm customer.

"The farmyard and the rolling acres of a pasture at the Cletus R. Fredericks farm, southwest of Addison, scene of the celebration, turned into a quagmire during the day, but no one seemed to mind.

"They heard some significant statements regarding rural electrification in Michigan and they were well entertained by Consumers.

THE colorful ceremonies held on the farm of Cletus Fredericks near Hillsdale, Michigan, as reported by the *Jackson* (Mich.) *Citizen Patriot* in the story on these pages, featured a barbecue for those attending, a speech by the Governor of Michigan, a full-scale farm equipment show by national electrical manufacturers, continuous cooking and home freezing schools for farmers' wives and an all-day band concert by a champion 4-H club band.

The occasion of connecting farm No. 100,000 to Consumers Power Co. rural lines also signalized a quarter century of pioneering in this field by the company, dating back to the establishment of farm experimental lines on a nationally recognized basis in cooperation with State authorities, farm organizations and farm equipment manufacturers.

Approximately 99 per cent of all farms in Consumers Power territory are now electrified. The company serves more farms than all REA cooperatives in Michigan combined, and at lower average rates than any of them.

Pails, representing a month's supply of pump water for an average farm family (nearly 5 tons), set the background as Mrs. Cletus Fredericks stands at the old hand pump for the last time. The Fredericks farm, No. 100,000 on Consumers Power Company's lines, whose electrification was dedicated in ceremonies on October 6, 1949, now has electricity to pump water for 4½ cents a month.

"Governor G. Mennen Williams, making the main address at the formal program during the afternoon, spoke of the interdependence of Michigan farms and industry.

Three Wires

"The governor called the 'three wires that carry electricity into the farm home a symbol of the interdependence of farms and industry.'

" 'Those three wires run back to the power plants and to the industries which serve them,' Governor Williams said.

"The state's chief executive congratulated Consumers for an accomplishment which he said is unique. He pointed out that Consumers is the only company in the country which is serving 100,000 farm customers.

"The governor added that Michigan, with 99 per cent of its farms electrified, is the 'champion of all states' in this type of progress.

" 'Here in Michigan,' he said, 'we don't have to choose between the farm and industry. We have both, blended together with a recreation area in which it is marvelous to live.'

"Justin R. Whiting, Consumers Power Co. president, called the event a double celebration for the company. It marked the connection of the 100,000th farm service and the 25th anniversary of the company's first rural line, which ran north from Parma and was built in 1924.

Michigan Governor G. Mennen Williams (kneeling, foreground) and Justin R. Whiting, president of Consumers Power Co. (center, background) are shown with the family of Cletus Fredericks, owner of the 100,000th electrified farm in Consumers Power territory.

Output Increased

" 'Development of rural electrification,' Mr. Whiting said, 'is one reason why Consumers has had to increase its generating capacity in the past few years.'

" 'Farm electrification is helping to make Michigan a better state,' he added. 'It is making farm life easier and more productive and more appealing to the younger generation. In the light of these facts, there is a lot of satisfaction in having had some part in electrifying rural Michigan.'

"C. V. Ballard, director of the agricultural extension service of Michigan State College, traced the history of rural electrification in the state and paid a tribute to H. J. Gallagher, general farm service supervisor of Consumers, who presided at the program.

"Mr. Ballard told how Mr. Gallagher, as a member of the college staff, fought for rural electrification and was instrumental in the building of an experimental line between Mason and Dansville in 1927. This line, built by Consumers in cooperation with MSC, proved the value of rural electrification.

Welcome Address

"Dan E. Karn, vice president and general manager of the company, gave the address of welcome and introduced Friedrich Henningsen of Grass Lake, from whom the company purchased the grand champion 4-H Club steer at the county fair.

"Mr. Karn gave the 4-H Club member a check for the purchase price of the steer, $563.79.

"Beef sandwiches from the prize steer, barrels of Michigan apple cider and bushels of doughnuts kept the crowd out of the rain and busy for about an hour and a half.

"The beef was roasted over an open barbecue on a spit which was turned by an electric motor. Lines moved continuously through the big tent covering the serving tables as the guests picked up a thick sandwich and a cup of cider then came back for seconds, thirds or fourths.

Program Altered

"Consumers officials hastily reshuffled the program arrangements to keep the guests in the shelter of tents as it rained.

"The speaking program was held in the tent which had been set up for the cooking school. The Jackson County 4-H club band performed in the lunch tent, with the music being carried to the main tents and over the grounds by a public address system.

"The area which had been set aside for parking became ankle deep with mud so the company recruited a fleet of tractors from neighboring farmers to pull cars to the gravel road.

"The main program tent was jammed and the public address system carried the words of the speakers to visitors who found shelter in the food and exhibit tents.

Muddy Trek

"Gov. Williams arrived just before the program was scheduled to start at 2 p. m. and ate a beef sandwich as he plodded through the mud to the tent where he was to speak.

"After the program, the governor visited with Mr. and Mrs. Fredericks and posed with them and their four children for newspaper and newsreel pictures.

"Mr. and Mrs. Fredericks are the owners of the 50-acre farm which was restored to productivity this year after being abandoned for a number of years. Their home, which is open for inspec-

(*Continued on page* 391)

The "Cooking and Freezing School," conducted by Consumers Power Company's home service women, gives a demonstration for a farm audience in the 160-foot circus tent at the celebration of the connection of the Fredericks farm, 100,000th to be electrified in Consumers Power territory.

The Electric Power Situation in New England

By R. H. Knowlton

President, The Connecticut Light and Power Co.

THE economic development of a region depends upon its geography, its geology, and its topography. As is well known, nature was by no means generous in its natural resource distribution to New England, since it has neither coal, oil, iron ore, copper, cotton, wool, etc., and the productivity of its soil hardly compares with more favored sections of the country, such as Illinois and Iowa.

Water Power in New England

Its people, therefore, early turned to the development of industry, but of necessity had to specialize on fabrication and processing of imported materials rather than on basic industry, such, for example, as steel. From the very beginning water power, such as it is in New England, has played an important role, which perhaps has given rise to the idea that it constitutes in these days an available natural resource, full advantage of which should be availed of. It is appropriate, therefore, to appraise its value by applying to it certain fundamental criteria. They are:

1. The difference in elevation between the headwater of a stream and tidewater and the reduction in elevation per mile of stream flow, since the drop in feet at any one point, namely, the head, determines the amount of power that can be generated by the amount of water flowing.
2. The typical rainfall in inches per year, its distribution over the seasons of the year, its departure in minimum and maximum from the typical flow, the portion of the total rainfall that will be taken up by evaporation and soil absorption, and the extent of the area that will collect the rainfall and conduct it to the stream, commonly referred to as drainage area.
3. The value of the land for agricultural or other purposes that will be flooded by the erection of a dam that establishes the head for power generation application.
4. The availability and character of the power market and its distance from the power generation site.

Available Head

In respect to the first criterion, namely, the head, 1200 feet is representative of the difference between stream headwater elevation and tidewater, and drops in elevation at any one point of 100 feet are usual. In contrast, however, in the far West and Northwest, owing to the presence of the Rocky Mountains, the difference in elevation between headwater and tidewater ranges from 3,000 to 6,000 feet.

The available head at a power site may be illustrated by that of Boulder Dam which is 582 feet, and several in Northern California, ranging from 1,375 feet to 2,100 feet. It is clear, therefore, that waterpower possibilities in New England are not at all comparable from the standpoint of head with the opportunities, developed and undeveloped, in the far West and Northwest sections of the country.

Rainfall

The same may be said with respect to rainfall,* twenty to thirty inches being typical of New England, while in the Northwest it ranges from sixty inches to one hundred inches. When it comes to drainage area, we compare still less favorably, since the total for the five principal rivers of New England is but 20,800 square miles as compared with 169,000 square miles for Boulder Dam, and 227,000 square miles for the Bonneville, Oregon, development.

It is not surprising, therefore, that the largest New England water-power plants range from 70,000 to 150,000 kw, while that of Boulder Dam is 1,035,000 kw. When in addition to these factors it is noted that the minimum flow of the Housatonic River is but 375 gallons per second, as contrasted with a maximum of 151,000 gallons per second, it is no wonder that industry and the utilities have found New England streams unreliable in meeting market power demands, particularly as the latter cannot be made to conform to stream flow.

About two and a half years ago, a special article writer in one of the Boston daily newspapers accused the utility industry of neglecting to develop the one great natural resource in which he alleged New England abounded, and stated that this neglect resulted in high power costs which were forcing the migration of industry from New England, particularly textiles, to the South.

New England Council Report

The New England Council, formed in 1925 for the avowed purpose of fostering and increasing industry and all types of business in New England, including recreation, took note of the accusation and determined upon an investigation. Accordingly, it appointed a committee comprising 19 representative business men of New England, under the chairmanship of Mr. E. H. Hunter, a director of the Council from New Hampshire, and chairman of New Hampshire's Public Service Commission. The committee engaged the services of Chas. T. Main, Inc., consulting engineers of Boston, which has enjoyed an enviable reputation for upwards of half a century, and its president, Mr. Uhl, personally directed the study requiring somewhat more than one year to complete. The results of the study were submitted to the committee, which made its report to the Annual Meeting of the Council in December, 1948. The report found—

1. That the development of the water-power resources of New England was among the highest in the country — that in Maine, which prohibited by law the export of water power, it developed 254,000 kw, and had for feasible development 263,000 kw—that in the remaining five states 668,000 kw had been developed and that there remained but 157,000 kw to be developed. Furthermore, that 71,000 kw had been developed in New England since VJ-Day. Finally, it reported

* run off

that the additional power requirements in these five states during the next ten years would amount to somewhat in excess of one million kilowatts. So, that with but 157,000 kw of feasible water power yet to be developed, chief reliance in future, as in the past, must be on steam-generated power.

Steam Vs. Water Power

The Connecticut Light & Power Company has fully recognized the value of water power since its Bulls Bridge Plant on the Housatonic River was constructed in 1903, and it now has in operation a total capacity of 68,000 kw, or 20 per cent of its total. In order to partially overcome the variable flow in the Housatonic River, it invested a large amount of capital in the construction of its Rocky River Plant, which utilizes water pumped from the Housatonic River to the Rocky River basin, 230 feet above. The waters thus stored, now being known as Candlewood Lake, have a shore line of more than 60 miles. The Company still has undeveloped water rights of upwards of 50,000 kw, but since 1928 has been unable to justify their development because the resulting power cost exceeded that of steam power, notwithstanding the relatively high fuel costs available to it.

2. That with few exceptions power costs constituted a minor factor in determining the location of the industries of New England, and was far from the reason for the migration of a part of New England's textile industry to the South. Its finding was based on the fact that the power cost differential between the rates charged in New England and those of the South amounted to 1.5 mills per yard of cotton goods selling at 20 cents a yard, and 3.7 mills per yard of woolens selling at $3.00 to $5.00 per yard. Therefore, the power rate level in New England did not occasion the migration of the textile industry, but rather the availability of raw material, climatic conditions, cost of living, the availability of labor at lower rates, and taxes.

Further support for this finding is had by reference to the statistics compiled by the Connecticut State Labor Department, taken from the last available year, namely, 1947, which clearly understates the 1949 situation. A survey of eleven woolen and worsted mills, fourteen cotton and rayon mills, and three print and dye plants, located in Eastern Connecticut, indicated an average wage of $1.28 per manhour. If power costs were increased 20 per cent, the equivalent increase in wage would amount to but 1.1 cents per manhour. Since the current wage level is higher than that of 1947, it is clear that power costs in Connecticut, as well as New England, do not constitute a controlling economic factor.

It is significant that none of the textile companies that have left Connecticut have located in the TVA territory, where the subsidized power rates are lower than those quoted in the area in which they have located.

$100 Unclaimed

The New England Council has utmost confidence in the capacity and integrity of Chas. T. Main, Inc., and so stands ready to pay $100 to anyone who will supply it with authoritative information in support of the contention that high power rates have caused or are causing industry to leave New England. In fact, there is evidence that just the reverse is true, since the Federal Reserve Bank of Boston recently reported a net gain of about 1,000 industrial units since the close of the war.

Misleading Statements

In view of the findings of Chas. T. Main, Inc., and their endorsement by the New England Council, one may wonder at the following statements made by responsible high-ranking government officials.

1. The February 3rd issue of the New York *Times* reported that Secretary of the Interior Julius Krug in an interview said that if "low-cost Federal power" had been available, the loss of industry in New England to the South and Southwest could have been averted.
2. In an address before the Textile Workers of America in Worcester, May 14, Assistant Secretary of the Interior C. Girard Davidson said—

"A long look at the electric power situation in New England makes one wonder how industries can afford to remain here.

"The private utility companies will tell you that it costs more to generate electric power in New England. But they don't tell you the reason why. With a few exceptions, the utilities companies in New England are using expensive, outdated — and wasteful — methods for generating power. The utilities companies have left undeveloped most of the potentialities of New England's fine rivers which could be turning more turbines to produce power.

". . . the undeveloped water power in New England rivers—all alone and without assistance from steam plants—could be harnessed to produce three and one-third million kilowatts."

The main conclusions of such propagandists are:

1. Power costs are a major factor in the migration of New England industry.
2. Low-cost hydroelectric power can be developed in New England, under Federal Government auspices in substitution for steam power.

Since Chas. T. Main, Inc., found that the undeveloped and feasible water power in New England amounted to but 420,000 kw, it is difficult to understand the basis for the Federal Power Commission's opinion that there remains to be developed three and one-third million kilowatts of feasible water power, particularly in view of Chas. T. Main, Inc.'s, opinion that the total, both developed and undeveloped, is only about 40 per cent of the alleged three and one-third million kilowatts. Without doubt, the latter includes about 200,000 kw at Passamaquoddy which the Federal Power Commission's 1940 report said could not at that time successfully compete with river hydroelectric power potentially available in the State of Maine, or with power from modern, efficient steam-electric plants.

Expansion of Steam Capacity

There is but one statement made by Mr. Davidson in Worcester that remains to be answered, and that is his claim about the use by the utility companies of New England of "expensive, outdated —and wasteful—methods for generating power." In all likelihood the efforts to improve steam-plant generating efficiency by The Connecticut Light & Power Company are representative of those of the larger New England utilities. Since VJ-Day it has installed 115,000 kw of new capacity, and is in the process of installing 125,000 kw in addition. This program is scheduled for completion by December 1, 1950, at which time 84 per cent of its steam capacity will require the consumption of but from 8/10ths to 9/10ths of a pound of good quality coal to generate a kilowatthour—an accomplishment that is exceeded by no other power-generating agency in the country, whether privately or publicly owned. Such facts were available to Mr. David-

son had he cared to avail himself of them prior to his May 14 address.

The Tax Situation

The late Franklin D. Roosevelt said that electric service is essential to modern-day community life. If so, and the consuming public desires to have the privately-owned utilities afford rates comparable with those charged by federally-owned enterprises, it should relieve privately-owned utilities of the payment of taxes to the federal government, as are federally-owned ones. Such taxes constitute 70 per cent of Connecticut Light & Power's total tax bill, or more than $4,100,000 per year. The argument against this relief is, of course, that the burden of this tax would have to be shifted to other sources, and so in all likelihood would fall upon the same electricity-consuming customers. However, this is precisely what happens in any event when the federal government undertakes in any area, such as TVA, the exclusive generation of electric power. It would appear, therefore, that consumers in areas supplied by privately owned companies are entitled to the same federal tax treatment as though supplied by a government-owned system.

If nationalization of the privately owned power industry aided by freedom from federal taxes is accomplished it will constitute the first completed highway to a socialistic state, which would, of course, be followed by the socialization of medicine, insurance, banking, and if Mr. Truman's threat comes to pass, the steel industry. It may be doubted that our economic system can be apportioned between state socialism and private enterprise.

If the public opinion polls have significance, a substantial majority of our citizens do not want state socialism. Presumably, many of them are conscious of the fact that every productive enterprise requires capital, and in progressively larger amounts as machines displace human labor. Further, that under the private enterprise system they are free to invest their savings in any chosen direction and receive some paper evidence of having invested, whereas under state socialism they are relieved of their savings through taxation with the choice of the investment thereof resting in the administration that happens to be current.

Need for a National Power Policy

For many years the federal government has been reasonably prompt to recognize the exploitation of one group of citizens by another and has passed remedial legislation. Illustrations are the Wagner and Fair Labor Practices Acts to prevent exploitation of labor by employers; the Sherman Anti-Trust Act to prevent exploitation of the consumer by the producer; the Public Utility Holding Act to prevent exploitation of investors and consumers by large aggregations of capital; the Securities & Exchange Act to prevent the exploitation of the investor by promoters of doubtful integrity.

The federal government, however, has subjected itself to no restraint, and in pursuit of its apparent determination to nationalize the electric power industry inch by inch, it is exploiting the investor in the securities of the privately owned industry. In common decency, therefore, the federal administration should clearly and publicly state its plans and purposes so that investors who do not wish to assume undue risks may avoid trusting their savings to the privately owned electric industry.

General Public Utilities Corp. Uses Movie to Interest Investors

AN introduction via motion picture to acquaint prospective investors with the character of the companies and communities in which their interest is sought has proved successful in connection with the recent sale by General Public Utilities Corporation of New York State of its entire common stock holdings in Rochester Gas and Electric Corporation of Rochester, N. Y.

The picture, titled "Progress and Power in Rochester and the Genesee Valley," is a three-part presentation, in full color and with sound. The first part is a short address by GPU President Albert F. Tegen, in which he outlines the reasons for the relinquishment of the Rochester utility.

In similar transactions in the past the usual method has been to send a group of top executives around the country to talk to security dealers and prospective investors, or to make up several crews, each of whom had to carry truck loads of charts and exhibits. The tour became a race against time with fatiguing one-night-stands in many different sections of the country.

Another difficulty was the fact that there was no assurance that presentations would be identical in each city and that while company officers might be competent operating executives they sometimes lacked skill in platform delivery.

Weighing all of these points General Public Utilities and Rochester Gas and Electric decided to utilize a 16mm sound motion picture which could be shown simultaneously to security dealers in many cities in the country. This not only eliminated the necessity for shipping truck-loads of exhibits from city to city but it insured uniform presentation of the facts regarding the securities which were being offered for public sale.

Following the short introduction by President Tegen, the second, and longest part, shows the operations and facilities of the operating company, as well as the character of the community it serves. The closing part is a detailed analysis by James A. Lyle, Vice President of First Boston Corporation, in which he describes the manner of security dealer participation in the program.

The film was so produced that the center portion can be used as a public relations vehicle for the Rochester utility in its own area.

The preparation of script, photography and general information was handled by Bruce Aldon Associates, 34 State Street, Rochester, N. Y.

T. R. Dobson

THOMAS R. DOBSON, vice president of Jersey Central Power & Light Co., Asbury Park, died suddenly of coronary thrombosis on September 18 at his home. His age was 49.

Mr. Dobson came with the Jersey utility in 1945 from Altoona, Pa., where he was, for a number of years, associated with Pennsylvania Edison Co., now Pennsylvania Electric Co., as vice president in charge of sales. While he was with Jersey Central Power & Light Co., he directed all sales activities and was in charge of rates and commercial offices.

He was a director of the New Jersey Gas Association and vice-chairman of the New Jersey Farm Electrification Council.

Wisconsin Governor Lauds Electric Research Farm Project

THE Electric Research Farm of the Wisconsin Utilities Association, the only known farm in the world exclusively devoted to this type of research, was inspected by electric company executives and their assistants, approximately 50 in number, together with editors of farm publications, trade publications and newspaper farm specialists who toured the project on Sept. 20. Prof. F. W. Duffee, A. M. Einerson, project leader, and members of the Wisconsin Utilities Association's Farm Sales Committee conducted the tour which was climaxed by a radio broadcast at which a congratulatory letter from Governor Oscar Rennebohm was read.

Research Ways to Cut Chore Time

The 144-acre farm, owned by the Wisconsin Utilities Association, is located one mile west of Madison. It is being used by the University of Wisconsin to conduct experiments which professors believe will demonstrate that chore time on dairy farms can be cut in half through the automatic use of electricity and proper location of buildings.

Speakers on the broadcast were Prof. Duffee, Grover C. Neff, president of the Wisconsin Power & Light Co., and Catherine Young of the Home Economics Department, University of Wisconsin. The letter from Gov. Oscar Rennebohm, who was unable to be present, congratulated the University of Wisconsin and the Wisconsin Utilities Association for cooperating in this experimental project.

Gov. Rennebohm in his letter to Mr. Neff said:

"As a farmer I know that the ultimate objective of this splendid undertaking is to discover ways and means of reducing the time required for farm chores by 50 per cent. As a farm owner I also know that chores are the farm bottleneck and if your final objective is accomplished, I can well appreciate what this would mean to the income of the individual farm family and to the prosperity and welfare of our state.

"Although the Electric Research Farm is a comparatively new undertaking, I understand that definite progress toward your objective has already been made and that hopes for practical accomplishments in the future are most encouraging.

"As Governor I want to congratulate the Wisconsin Utilities Association for undertaking this electrical research farm project at substantial expense, and the University of Wisconsin for cooperating constructively in the interests of improved agriculture.

"Please accept my best wishes for continued progress and success."

Grover C. Neff explained, in an afternoon radio broadcast over stations WHA and WKOW, that:

"We believe results will be obtained at the Electric Research Farm that will be far-reaching in their effect and will prove of great value not only to farmers but to everyone in the entire state.

"Now for nearly four years the University has been carrying on important research work here and is making progress in finding ways and means effectively and efficiently to reduce the time of doing farm chores.

Wisconsin Farms 92% Electrified

"This matter is becoming increasingly important, for more than 92 per cent of Wisconsin farms now have electric service available. About 100,000 farms in the state are served by electric companies, 55,000 by cooperatives, and 8,000 by municipal utilities. The vast network of farm electric distribution lines necessary to take service to the farms of this state is about completed. However, the application of electric power to farm operations, particularly in and about the farm buildings, is still in its infancy. We of the electric light and power companies are very much encouraged by the work done to date. We believe the University research work now under way here at this farm will discover new and better ways to apply this power to jobs now done by human muscles.

"If this research project works out as we think it will, the average Wisconsin farm family can operate a larger farm with the same help as at the present time, or can operate the present farm with less manhours. This will benefit both the farmer and his city neighbor.

"While we of the electric light and power companies have provided the re search farm and are paying the out-of pocket costs of conducting the experiments, the results obtained here will be of equal value to users of electric service on all farms, whether they get that service from the electric operating companies, REA co-ops, or municipal utilities. The University is, of course, primarily interested in the user of the service and not particularly in who supplies it. The success of this research farm project rests squarely on the shoulders of the capable University of Wisconsin men who are devoting so much of their time and effort to finding better ways of applying electric service to farm operations."

Time Saving Equipment Exhibited

Among the featured time-saving devices invented or perfected by the University researchers and explained, were electrically charged cow trainers which make possible the use of longer stalls and thus prevent udder and leg injuries, equipment to provide more efficient handling and storage of milk, a power-driven silo unloader, electric barn cleaning machinery, and a hay drier. Numerous time-saving appliances are also being experimented with in the brooder and poultry houses, tool and machine shops.

While the researchers have concentrated their efforts on lightening the labor load in and around the dairy barn they have not neglected the rural housewife. The farm residence is equipped with a score of labor-saving appliances from basement to attic.

Reducing Livestock Chore Time

Prof. Duffee, who also addressed the radio audience, stated:

"We are told that it takes just about as many manhours to produce 100 pounds of milk today as it did 40 years ago; but here at the Electric Research Farm we hope to develop ways and means of greatly reducing the time required for livestock chores through the use of more efficient electrical equipment properly installed in more efficient barns; just as tractors and tractor machinery have reduced field work."

RECENT EEI PUBLICATIONS

A-C Network Operations, 1944-1946

EEI Pub. No. Q-12. A report of the Transmission and Distribution Committee of the Edison Electric Institute. 39 pages. Price $1.60 to members and their employees; $1.50 to non-members in U. S. A.; $1.65 to foreign countries.

EIGHTY companies submitted data on operations of 272 networks in 68 localities which were compiled and tabulated for the period of 1944-1946, inclusive. These data have been tabulated, summarized, and compared with data of previous reports wherever possible.

The peak load served by low-voltage A-C Networks in 1946 was 2,931,277 kva, an increase of approximately 42 per cent over that reported for the 1943 peak. The total installed transformer capacity was 5,401,672 kva, giving a ratio of peak load to transformer capacity of approximately 54 per cent.

Almost 34 per cent of the companies supply their network systems with a primary voltage in the 13- to 14-kv class. The 120/208, 3-phase, 4-wire is still the most widely used network system voltage; however, a trend toward the higher voltage, 125/216, is indicated.

Approximately 50 per cent of the protectors in use are of the motor fly-ball type. The phasing relay comprises 40 per cent of the total relays used in protectors.

The failure of protectors on normal switching and testing has been reduced by 50 per cent since the previous report, and the failure rate on faults by 33 per cent. The number of protectors failing to open per 100 normal switching and testing operations was about 12 times the number of failures to open per 100 fault operations.

Oil-filled transformers comprise 88 per cent of the total banks and 90 per cent of the total capacity. The failure rate for transformers purchased after January 1, 1931, is considerably greater than for those purchased prior to January 1, 1931. This is contrary to that reported in the previous report. The failure rate per 100 banks for the transformers for this period is below that of any other period.

Of the three most widely used types of cable, paper-lead, non-leaded, and rubber-lead, the failure rates are, respectively, 4.1, 3.28, 0.79 per 100 cable mile years. Excluding the failures that occurred in joints, these rates become 2.63, 2.88 and 0.79 respectively. The failure rate of all secondary cable is 3.28 failures per 100 cable mile years. This is an increase of 60 per cent over previous reports.

The number of companies having limiter operations and fuse operations has increased approximately 75 per cent over the previous period. The circuit feet of cable damaged is 3323 ft which is approximately 50 times that reported in 1941-1943.

The number of complete network outages is lower than that listed in the last report, and the outage rate per locality per year is at its lowest value.

The period of inspection varies with each individual company, and with the type of equipment inspected. An indication of the rate of failures for transformers per inspection period was attempted, but no definite conclusions could be drawn.

There were nine reported explosions or sustained fires in transformers. These have been listed in order of their occurrence and discussed as to size, type and location of transformer, cause, result and damage of explosion or fire. Explosions without resulting fire occurred on four non-inflammable, liquid-filled transformers and on two oil-filled ones. Explosion associated with fire occurred on three oil-filled transformers.

Comparisons with data of the previous report should be made with the thought in mind that the two reports do not include the same companies, and that several of the companies had only partial information.

Boilers and Combustion, 1948

EEI Pub. No. R-1. A report of the Boilers and Combustion Subcommittee of the Prime Movers Committee, Edison Electric Institute. 52 pages. Price $1.00 to members and their employees; $2.50 to non-members in the U. S. A.; $2.65 to foreign countries.

THIS report contains statements by the subcommittee and operating companies on problems relating to boilers and combustion, including:

- Failure on Pressure Parts
- Non-Pressure Parts Failures and Troubles
- Fuel Burning Equipment
- External Tube Deposits
- Retractable Soot Blowers
- Combustion Control Differential for Fan Control
- Combustion Air and Ventilation
- Ash Hoppers
- Draft Loss through Boiler Units
- Availability of Single-Boiler, Single-Turbine Plants
- Coal Sampling, Coal Weighing and Efficiency Calculations

and Statements from the manufacturers on:

- Boilers, Superheaters, Furnaces and Air Heaters
- Ash Handling and Dust Removal Equipment
- Burners for Oil, Gas and Pulverized Coal
- External Boiler Cleaning Equipment
- Stokers, Coal Pulverizers and Burners
- Combustion Control Equipment

Boiler tube failures, the report notes, have been caused mostly by fly ash cutting the tubes and by action of the blowers.

From evidence of the statements submitted, the non-pressure parts of boilers are not causing excessive difficulty, although three statements deal with trouble of air heater tubes and other parts due to erosion, corrosion and breakage of parts.

For boiler units purchased in 1946 and 1947, twelve of the eighteen companies reporting on combustion control differential pressure taps for fan control, are using some section of the products of the combustion side of the boiler unit for locating the pressure taps to obtain the actuating pressure differential required for fan control.

In four of the six companies using the air side of combustion air curcuit, some special device is provided for obtaining the pressure differential measurement.

Apparently the difficulties with the taps on the gas side that can be expected, such as dust clogging of tubes, slag accumulation in tube banks, disturbances due to slag blowing, etc., are not too much of a factor since most of the installations reporting use the gas side for this actuating differential.

Statements from eighteen companies describe their experiences with retractable soot or slag blowers. It is indicated from these statements that functionally this type of blower is effective. They are usually installed in the hottest portions of boilers and their use has resulted in eliminating hand cleaning

methods and have enabled boilers to operate for longer periods.

The problem of admitting large quantities of combustion air into power plant buildings and also maintaining comfortable working conditions at main working levels throughout the year, has not been too easy to solve; especially when it is desired to reclaim radiated heat, to maintain a definite minimum air temperature to fan inlets, to economize on space and duct runs and to prevent freezing of the water pipes.

Seventeen companies reported briefly on certain phases of ash hoppers. In most of these cases, the ash hoppers are emptied every 8 hours or less although several are on a 24-hour schedule. Practically all the installations were reported as being satisfactory.

Comparison of draft values between actual operating values and manufacturer's estimates show variations from actual performance of as much as minus 40 per cent to plus 29 per cent. To calculate this per cent variation, corrections were made to the manufacturers' values to equalize furnace pressures.

Furnaces are being operated with higher drafts than manufacturers' estimates.

Several companies use a fixed value for a unit of draft loss or power equivalent as a factor in evaluating bids for new boiler units. No company reported using a penalty clause for variation of draft loss with estimated values.

The average per cent availability (defined as total period hours minus total outage hours divided by period hours) for nine of the plants reported as operating a full year or more, is 91.18 per cent for the total period since starting the plants with the highest value reported as 97.16 per cent.

For general interest, data on the period interval for calculating plant or unit efficiency were collected. Ten of the 31 companies prepare some operating data on a daily basis, but in general, a longer period interval is used for complete breakdown and calculation, usually being one week or one month.

Turbines, Condensers and Auxiliaries, Feedwater Heaters and Evaporators, 1946-47

EEI Pub. No. R-3. A report by the Turbines and Condensers Subcommittee of the Prime Movers Committee, Edison Electric Institute. 78 pages. Price $1.40 to members and their employees; $3.50 to non-members in U. S. A.; $3.75 to foreign countries.

THE section on Turbines contains the replies to a questionnaire sent out by the subcommittee to forty-eight operating companies. They reported on 123 new turbines ordered or installed during 1946 and 1947. Twenty-eight of the companies furnished statements on current practices, and three manufacturers furnished statements on design features and noteworthy installations. The report includes data on Preferred Standard units, in order to show reasons why companies depart from them when ordering new units. The reasons most frequently given are: to duplicate existing equipment, to obtain greater capability, and to meet system capacity requirements most economically.

There is, apparently, still very little replacement of old equipment being done. The reason, given by five companies replacing old units, is to increase capacity, although two state that boilers and turbines replaced were worn out. Improvement in economy is not given as an important factor at this time.

In an analysis of turbine operating and outage data for 1946 and 1947, the report shows that although the total rated capacity of units reviewed showed that there was about the same amount of increase in 1947 over 1946 as in 1946 over 1945, the power generated in 1947 was a marked increase over that in 1946.

The small margin of capacity reserve for the industry during the war made it necessary to lengthen the interval between equipment inspections, where possible, and to reduce the outage loss of capacity to a minimum. The success of these efforts is illustrated by the reduction of total average outage hours per unit from 794 in 1945, to 737 in 1946, and to 605 in 1947.

Reports of simultaneous unscheduled outages of major plant equipment were obtained from 13 companies. Of the 47 simultaneous unscheduled outages reported, 24 were caused by troubles associated with turbine-generator units, 18 were caused by boiler troubles, and 5 involved the outage of a turbine-generator unit and a boiler associated with another turbine-generator unit.

Design and operating data for the section on condensers and auxiliaries were provided by 27 member companies and 5 manufacturers. The principal items covered by this section are: (1) Rebuilding Old Condensers, (2) Current Standard of Tube Fastening, (3) Waterboxes, (4) Feedwater Heaters Located in Throat of Condenser, (5) Deaeration in Condensers, (6) Circulating-Water Pumps, (7) Condensate Pumps, (8) Air-Removal Pumps, (9) Condenser Leakage, and (10) Chemical Cleaning.

General design and operating data for feedwater heaters covering the years 1946 and 1947 were provided by 27 member companies and two manufacturers. In the selection and location of heaters, the choice between horizontal and vertical arrangements of closed feedwater heaters is about equally divided among the reporting companies, some using both types. The selection is generally determined by the space limitations of the particular plant layout.

Various arrangements of heater bypass piping were reported by 22 companies, with 12 bypassing each heater individually, and the others bypassing some or all of the heaters in groups of two or more. Those companies who do not install bypass piping employ duplicate banks of heaters, with feedwater flowing in two parallel circuits so that either bank can be cut out entirely in the event of tube failure.

Other items covered in this section include deaerator and evaporator practice, heater troubles, level control and chemical cleaning.

Branch Circuit Overcurrent Protection
For Low-Voltage Circuits of 30 Amperes or Less Used for Interior Wiring

EEI Pub. No. R-9. A report of the Joint Committee on Branch Circuit Protection of the Association of Edison Illuminating Companies and the Edison Electric Institute. 52 pages. Price $1.00 in U. S. A.; $1.25 to foreign countries.

THE protection of electrical circuits is as old as the industry itself, a fusible link having been used for this purpose in the earliest electrical supply circuits. The inadequacy of the open-link type fuse was early recognized and, in 1882, the Edison screw base or plug type of fuse began to replace it for disconnecting lighting circuits in case of overload or short circuit. This fuse served the industry well. However, in the early Thirties, the plug fuse became subject to abuse—or at least, accused of abuse — for the principal reason that loads on the branch circuits had increased tremendously. Several solutions to this problem were offered which resulted in the introduction of small enclosed cir-

cuit breakers and "tamper-resisting" types of fuses.

Following several years of discussion in the industry, the 1940 National Electrical Code included a requirement for the Type S plug fuse—intended as a standard tamper-resisting type. This requirement was suspended, however, as the Type S plug and locked adapter design did not take into proper account the necessity for complete interchangeability in service with the Edison base fuse which had been used universally for over half a century. As a result, general acceptance has been limited; and the industry and the general public have been confused.

Prior to the release of the 1947 edition of the Code, a similar mandatory Code requirement for the Type S fuse was suspended pending the making of a complete investigation of branch circuit protection. Following this the Board of Directors of the National Fire Protection Association established a committee to make this investigation and the Light and Power Industry agreed to cooperate in this work.

In November, 1946, the Edison Electric Institute and the Association of Edison Illuminating Companies organized a committee which was designated as the EEI-AEIC Joint Committee on Branch Circuit Protection and whose purpose was:

> ". . . to conduct a fundamental engineering study of the overcurrent protection problem as it relates to branch circuits, including a re-examination of the basic objectives of such protection and the best methods of obtaining them, with due regard to the effects of the trend of heavier capacity systems to supply increasing loads."

As the result of two years of effort by the Joint Committee and its various subcommittees and working groups, a comprehensive study of the requirements of residential branch circuits has been completed. This study covers branch circuits in dwelling occupancies including single- and multi-family dwellings and individual apartments. The scope of this report is outlined briefly as follows:

1. A survey to determine the prevalence of fires from electrical causes.
2. A study of the present and future load requirements of residential branch circuits and the effect of starting characteristics of modern electrical appliances.
3. A review, re-study, and tests of the current carrying capacities of branch circuit conductors.
4. A study to determine the optimum time-current characteristics of branch circuit protective devices.
5. A study of the physical design of existing and proposed protective devices to determine the possibilities of coordination and interchangeability of future designs.
6. A survey to determine the operating experience with plug fuses.

A Suggested Commercial Customer Information Booklet

EEI Pub. No. R-11. A report by the Market Development and Electrical Applications Committee, Edison Electric Institute. 16 pages. Price $0.25.

THE Market Development and Electrical Applications Committee believes that commercial sales organizations of electric utility companies can profitably use a customer information booklet, especially prepared for distribution to new commercial customers. This may take the form of a small booklet, leaflet or folder, which will list the many services offered to these customers by the the utility company, and will furnish other information of a helpful nature, and lead to better understanding between the new commercial customer and the company.

When a new commercial customer requires connection, he usually has questions and problems pertaining to his electric service, which can and should be answered by the company's commercial representative. Whenever possible, the commercial representative should make immediate contact with the new customer, in which case the proposed booklet can be left with him. It is not always possible, however, to make this personal call immediately after service connection, and in these cases the booklet could be mailed to the customer.

When a customer does not know of the services available to him and does not know where to call or for whom to ask, when he has a question regarding his electric service, public relations suffer and the opportunity to make a good first impression is lost. Customers should understand that the electric utility is a service organization—that when they pay their electric service bill, they are entitled to more than the electricity registered on the meter. Even though the customer may be small, he likes to be recognized and to know that his business is appreciated.

The booklet, besides describing services available, should provide telephone numbers, with specific information on which to call and for what department to ask, when the customer is in need of any of the services offered by the company. There should also be a space provided for the customer to write in his name, address and telephone number of his electrical contractor.

Besides the suggested Customer Information booklet, the report also outlines a possible mailing piece to take the form of a 8½ by 11 in. letter file, with pertinent information printed on both sides of the folder. It is intended that this file folder will be used by the customer for convenient filing of letters and other information that might be sent to him by the utility company.

A Study to Determine the Load and Revenue Potential of the American Drug Store

EEI Pub. No. R-10. A report of the Market Development and Electrical Applications Committee of the Edison Electric Institute. 16 pages. Price $0.25.

THIS report is the result of a market research study of the typical American drug store to determine its load building, revenue producing potentialities. The report points out the results to be obtained by actively promoting the drug store market. They are: (1) the securing of profitable revenue, and (2) improved customer and public relations.

The drug store is ideal because it offers high load factor, load building possibilities in the three generally accepted classifications of use by commercial customers — light, heat (cooking), and power. It is ideal because there are many drug stores in every utility company's territory. The drug store has besides one of the most profitable revenue possibilities per square foot of area. Moreover, the druggist can be a key figure in improved customer and public relations.

The study consists of two parallel studies in two widely separated cities. The first deals with a typical small neighborhood drug store in New Haven, Connecticut, while the second is concerned with a typical medium-sized urban drug store in Minneapolis, Minnesota.

Promotional plans for the development of this market are already in existence. The report points out that each company should, depending on local conditions, decide for itself how best to exploit this market.

Accident Prevention Committee Meeting

W. T. Rogers, *Chairman*

THE forty-second meeting of the Accident Prevention Committee was held on September 22 and 23 at the Robert Treat Hotel in Newark with 55 members and guests in attendance.

The meeting opened with an address by D. C. Luce, Vice President in Charge of Electric Operations of the Public Service Electric and Gas Company. He recognized the importance of active support of the safety program by top management. However, he emphasized that efforts for improvement must be started at the ground level and also stressed the need for developing enthusiasm for safety in the foreman. He noted the emphasis placed on training and job analysis by the Committee and expressed the hope that the Committee will continue to provide helpful material on these subjects.

Analysis of Industry Fatalities

D. C. Stewart presented an analysis of detailed reports on 149 of the 154 fatalities which occurred in the industry during 1948. Although the total number of fatalities is substantially below the 175 which occurred in 1947 this is the second highest number reported during the 8 years the analysis has been made. As in each previous year since 1941, about 70 per cent were due to electric shock or burn. There was a significant increase in the percentage of cases of hand contacts while performing line work on poles in 1947 and these remained at about the same level in 1948, accounting for 17.5 per cent of all fatalities in 1948 compared with 18.5 per cent in 1947. The one simple precaution of wearing rubber gloves in the primary area would have prevented most of these cases.

Completion of the text of the proposed field manual on the care and use of hot line tools was reported by P. L. G. Hasskarl. Preparation of photographs and illustrations is now under way.

I. R. Dohr reported continued progress in preparation of a revised ASA specification for rubber gloves. The Accident Prevention Committee expressed the need for similar specifications for low-voltage gloves for use on voltages of 600 v and below and for specifications for lineman's insulating rubber overshoes.

R. H. Coleman reported completion of a preliminary draft of a proposed specification for lineman's climbers which will be sent to members for comment.

Dr. W. B. Kouwenhoven of Johns Hopkins University described recent developments in resuscitation techniques with particular reference to the use of electric countershocks on victims of ventricular fibrillation. The Accident Prevention Committee reaffirmed its previous endorsement of a proposal that the EEI sponsor further research on this subject.

Drafts of several new posters for continuation of the series initiated earlier this year were presented for comment by A. H. Doud.

Protective Equipment

The entire afternoon of the first day was devoted to round table discussion conducted by R. P. Douglas. A few companies indicated that they use special guards to insulate new poles erected adjacent to energized lines and almost all require men on the ground to wear rubber gloves while handling the poles. Several also require rubber sleeves and grounding of trucks and derricks. Some companies represented require the use of rubber gloves while working on dead circuits above live primary circuits on the same pole regardless of the clearance from the live circuits or grounding of the dead circuits. Several companies require rubber sleeves wherever rubber gloves are required. Most use hot line tools on at least some phases of line work. One company has noted a substantial increase in the percentage of line hose rejected during the past two years. Little use of safety awards for individual employees was indicated. Low voltage extension light systems used by various companies range from 6 v to 32 v. The greater safety of 6-v or 12-v systems is offset by better availability and smaller size of equipment and easier provision for long extension at 32 v. Hard hats for linemen are seldom used except for steel tower work. A moderate acceptance of safety shoes with steel toe caps among linemen was indicated. Several companies provide for their purchase for linemen by payroll deduction. An unsatisfactory trial of fiber-toed shoes was reported by one company. A new pole-hole digger which operates suspended from a winch cable and tripod derrick was described. Although performance has been satisfactory the equipment appears to have certain hazards which need to be guarded against. The majority of companies furnish leather work gloves. No use of rubber boots which can withstand high voltage test for use as protective insulation for line work was reported.

W. R. Smith presented a preliminary report on safeguarding of work areas which includes numerous examples of serious accidents which could have been avoided by application of accepted principles of safeguarding, outlines principles of marking off safe and unsafe areas, instructions to watchers, the use of barriers and the proper use of various types of marking tape and pictures examples of proper application of these principles.

W. F. Brown reviewed replies to former EEI President Ernest R. Acker's appeal for continued effort to improve the accident record of the industry. These included emphasis of the need for continued active interest of top management, a study of the specific practices of the companies with the best safety records, more care in employment procedures and additional and continuous training of foremen and supervisors. A subcommittee will be appointed to review accident statistics and select companies with the better records for a study of their practices.

Report Recent Accidents

The latest in the series of Exchange Bulletins, describing recent accidents of particular interest, was presented by G. J. Ruoff. Cases included low voltage fatalities resulting from contact with an energized 120-v male plug in a concrete sump well of a water wheel turbine and contact with an uncovered bare secondary conductor following a climber cutout. Other serious and fatal accidents were the result of assuming an improper position on a pole while removing a transformer tap, contacting a 33-kv pole line with a steel cross brace being installed on a parallel steel tower line, contacting the energized bus while filing the rough edges of a bus tie cubicle, backing a line truck with derrick into a 33-kv line, failure to mark safe working area, moving on the pole while holding one end of an energized jumper resulting in cutout and contact, failure to wear rubber sleeves, failure to ground a de-energized transmission line, failure to secure a carload of poles with ade-

quate temporary binding and failure to wear rubber gloves while in the primary area. Mr. Ruoff also noted several cases where snaps on safety straps have become unsnapped when the snap on the double side of the strap has become twisted so that the keeper struck against the belt in such a manner as to allow the snap to open. One manufacturer is attempting to develop a better locking keeper.

Pennsylvania Electric Association Holds Forty-Second Annual Meeting

MORE than 700 representatives from Pennsylvania's electric companies gathered in Philadelphia on September 20 and 21 for the forty-second annual meeting and industry conference of the Pennsylvania Electric Association.

H. S. Fitch Elected President

H. S. Fitch, vice president of the West Penn Power Co., Pittsburgh, was elected President of the Association for the 1949-1950 term. Vice presidents are: George R. Conover, vice president of the Philadelphia Electric Co., Philadelphia; R. A. Gallagher, vice president of the Pennsylvania Electric Co., Johnstown, and James M. Huebner, vice president of Pennsylvania Power & Light Co., Allentown.

In an address of welcome at the opening session, H. P. Liversidge, Chairman of the Board, Philadelphia Electric Co., sounded a warning that government intervention in the utility field looms as a threat to all industry. He further stated, "In the final analysis it is in the arena of public opinion that the problems will be finally resolved. I am fairly convinced that facts are our most potent weapons in the war of ideas. . . . "

W. H. Doran of the Metropolitan Edison Company, Reading, retiring president of P. E. A., gave a report on Association activities during the past year.

Merryle Stanley Rukeyser of New York, economic commentator for International News Service, expressed the opinion that growing public awareness of the threat of socialization may change sentiment toward the spread of public power in the United States. He warned against measures which "may weaken the American economy without achieving the international objectives" and stressed the importance of maintaining the respect our potential enemies have for America's capacity to produce. This, he said, should not be lightly abridged by "hastily improvised, speculative international agreements loosely conceived to 'help' our friends and allies."

The concept that the United States is not importing enough, he said, "overlooks the fact that as a result of the power revolution the United States has been consistently reducing the ratio of imports to home production. To tamper with this basic trend would involve endangering the foundation on which American leadership depends."

The Conference sessions were highlighted by the appearance of Pennsylvania's Governor James H. Duff, who addressed the delegates, and State Secretary Theodore Roosevelt, III, who spoke on "The Emphasis of Pennsylvania Week on Pennsylvania Progress."

"Give Employees More Facts"

Keynote speaker at the second-day sessions was Dr. Allen A. Stockdale, of the National Association of Manufacturers. Dr. Stockdale cited the major task confronting management today as that of giving employees "the facts they need to understand their stake in our free enterprise economy." He said that lack of information about the industrial process is responsible for much of the "misunderstanding and conflict that trouble us today."

Other Conference speakers were Chester H. Lang of General Electric Co.; A. F. Tegen, president of General Public Utilities Corporation; Clayton Rand, publisher; Tom Fort of Westinghouse Electric Corp.; Francis X. Welch, managing editor, *Public Utilities Fortnightly;* and Elmer L. Lindseth, president of the Edison Electric Institute and president of The Cleveland Electric Illuminating Company.

PEA Safety Contest Awards

Winning companies in the Association's annual safety contest were presented with plaques and certificates of merit. Metropolitan Edison Co., Reading, took first place in Group 1 (companies averaging 200,000 or more man-hours monthly) with a frequency rate of 1.913. The Philadelphia Electric Co., Philadelphia, and the Duquesne Light Co., Pittsburgh, placed second and third, respectively, in this group.

Group 2 (companies averaging 60,000 to 199,999 man-hours monthly) winners were: first, Edison Light & Power Co., York, with a frequency rate of 1.672; second, Pennsylvania Water & Power Co., Lancaster; and third, Pennsylvania Power Co., New Castle.

In Group 3 (companies averaging less than 60,000 man-hours monthly) Natrona Light & Power Co., Natrona, and Home Electric Co., Tyrone, had perfect no-accident records, the former placing first by reason of more man-hours worked. South Penn Power Co., Waynesboro, took third place in this group.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946

Of EDISON ELECTRIC INSTITUTE BULLETIN, published monthly at Philadelphia, Pa., for October, 1949.

State of New York, } ss:
County of New York. }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Wilgar Coleman, who, having been duly sworn according to law, deposes and says that he is the Editor of the EDISON ELECTRIC INSTITUTE BULLETIN, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management . . . etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations) . . . to wit:

1. That the names and addresses of the publisher, editor, mangaging editor, and business manager are: Publisher, EDISON ELECTRIC INSTITUTE, 420 Lexington Avenue, New York City 17; Editor, Wilgar Coleman, 420 Lexington Avenue, New York City 17; Mangaging Editor, none; Business Manager, none.

2. That the owner is: EDISON ELECTRIC INSTITUTE—not incorporated—trade association; Elmer L. Lindseth, President, 420 Lexington Avenue, New York City 17; K. B. Crumb, Treasurer, American Gas & Electric Service Corp., New York; Mae B. Woods, Secretary, 420 Lexington Avenue, New York City 17.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

WILGAR COLEMAN,
Editor.

Sworn to and subscribed before me this 3rd day of October, 1949.

(Seal)

MAE B. WOODS,
Notary Public, Queens County.
(My commission expires March 30, 1950)

PERSONALS

GEORGE J. BURKE has been elected a director of The Detroit Edison Company. At the same time FRED A. COMPTON, sales manager, was elected a vice president of the company.

Mr. Burke succeeds RALPH T. MCELVENNY of Chicago who has resigned. He has practiced law in Ann Arbor since 1907, is counsel for the Board of Regents of the University of Michigan, president of the Citizens Mutual Automobile Insurance Co., Howell, Mich.; counsel for the Ann Arbor Trust Co. and the Ann Arbor Bank, and chairman of the operating committee of Argus, Inc., Ann Arbor. He also has been active in public affairs. He has served as a member of the State Civil Service Commission since its creation in 1937.

Mr. Compton has been sales manager of Detroit Edison since 1946. He was graduated from the engineering school of the University of Michigan in 1914 and from that date until 1923 was employed in the construction and engineering departments except for two years as an infantry officer in the first World War. He entered the purchasing department in 1923 and became purchasing agent in 1940. He is president of the Michigan Electric Light Association, member of the Engineering Society of Detroit, the American Society of Mechanical Engineers and the Purchasing Agents Association of Detroit.

ARTHUR K. HURLBURT, employment manager of The Detroit Edison Co., has retired. Mr. Hurlburt joined Detroit Edison during school vacation in 1903 as a meter reader. He advanced through several positions until 1917 when he organized the employment department, with one clerk as his assistant. He built it into a carefully organized department with five divisions. Under his direction many new techniques have been developed in the field of selecting the right man for each job.

During Mr. Hurlburt's more than 40 years of service with Detroit Edison, the company's employees grew from about 230 to more than 12,000.

Hurlburt helped conceive and supervise the Edison Relief Fund established by company employees in 1931 for the period of the depression.

Two Detroit Edison Co. executives, JOSEPH M. SULLIVAN and JAMES L. PATTON, have been promoted to take over the work for which Mr. Hurlburt has been responsible. Mr. Sullivan becomes employment manager, and Mr. Patton becomes manager of the new employee services department.

Mr. Sullivan has been employed by Detroit Edison since 1912 and has been assistant employment manager since 1939. He is president of the Detroit Employment Managers Club.

Mr. Patton has been with the company since 1911 and also has been assistant employment manager since 1917.

WALTER B. GESELL, who has been a vice president of the Oklahoma Gas & Electric Co. since 1947, assumed the top position in the operations department when he was recently named vice president in charge of operations, succeeding FRANK J. MEYER, retired.

Mr. Gesell's first association with Oklahoma Gas & Electric was in 1923, when as a member of the rate department of the Byllesby Engineering & Management Corp., he had supervision over OG&E rate procedure. In 1939 he moved to Oklahoma City in the capacity of executive assistant, still confining his activities to rate studies and to the structure of power contracts with larger customers and with government agencies. In 1947 he was named a vice president. He entered the utility industry as power plant engineer of Milwaukee Electric Railway & Light Co.

Starting as a lineman's helper, Mr. Meyer served as chief electrician, superintendent, gas department, electrical engineer, general superintendent, and assistant general manager and in 1931 was elected to the position he held at the time of his retirement.

Mr. Meyer has been active in the affairs of the Oklahoma Utilities Association for a number of years.

RALPH MCCUMBER of the Rochester Gas & Electric Corp., Rochester, N. Y., who has been general superintendent of the electric department, has been appointed general manager of all electric and steam operations. He has been with the company 26 years. LEO EAST, who has been general superintendent of gas operations, has been made general manager of gas and engineering operations, his department now including engineering and purchasing. Mr. East recently celebrated his twenty-fifth anniversary with the R. G. & E.

Both Mr. McCumber and Mr. East have also been appointed to the Management Council of the company, the other members of which are company officers. The Management Council plans and directs the various operations of the company.

On October 1st, W. E. CLEMENT, director of the utilization and research department, New Orleans Public Service, Inc., completed 55 years of service with the company.

He started work on October 1, 1894, as Edison Electric Illuminating Co.'s (New Orleans Public Service predecessor) office boy and lamp clerk. Within a year he was transferred to the electrical meter department. After several years he became meter test expert—then later, superintendent of the meter department.

In 1905, he was transferred to the new business section as sales manager of the electrical department. Later he took over gas sales also, remaining in that position until 1933. Since that time he has been active as director of utilization and research.

Mr. Clement is the inventor of several electrical devices and the author of numerous books and pamphlets on electricity and gas uses. One of his inventions was prompted by the need for a "quick electric service combination device." Originated in 1909, this device made electricity available to non-wired home owners from a quickly installed wall cabinet containing cords for lamp, fan and iron use.

R. B. GROVE, vice-president of Consolidated Edison Company of New York, recently announced a number of promotions as part of the company's general reorganization of its Commercial Relations Department.

FREDERIC J. PORTER, JR., has been appointed commercial manager in charge of customer relations and staff operations of the Commercial Relations Department.

His new duties are an enlargement of Mr. Porter's responsibilities of the past few years, during which he has specialized in organizing and directing customer contact operations, particularly as they related to operations of the twenty-eight district offices scattered throughout the city. For the past year he has served as manager of the Methods Bureau.

Active for several years as a member of industry committees, Mr. Porter served as chairman for the 1948-49 Customer Relations Committees of the American Gas Association and the Edison Electric Institute.

C. L. HAVENER has been appointed to the new position of manager of the Brooklyn retail accounts at the company's office at 380 Pearl Street, Brooklyn.

Starting in the Credit and Collection Bureau of the Bronx district, The New York Edison Co., in 1922, Mr. Havener later transferred to Manhattan where, in 1930-31, he was in charge of active accounts, collection division. Back in the Bronx in 1933, he became chief clerk of the Credit and Collection Bureau.

He assisted in the preparation of credit and collection procedures during the consolidation of various company groups into the present Commercial Relations Department and returned to the Bronx as floor supervisor when the Bronx Commercial Center was opened in 1936.

Mr. Havener has been active in committee work of the American Gas Association and the Edison Electric Institute, and is currently chairman of the Customer Collections Committee, AGA.

JOHN J. MCNAMARA has been appointed to the new position of assistant general commercial manager.

In his new assignment, he will direct commercial operations on a department-wide basis under JOSEPH F. ROONEY, general commercial manager.

Mr. McNamara began his utility career 34 years ago as a file clerk with the Brooklyn Edison Co. After military duty in the first World War, he moved up to head credit and collection activities for The New York Edison Co. in 1929. Following the 1936 merger of the New York utilities, he became commercial manager of credit and collection and, in 1938, system commercial manager in charge of the four accounting centers—one in each borough of the city. In September, 1946, he completed a three-year tour in the company's Executive Development Program, during which he handled managerial responsibilities successively in the Distribution Operation, Personnel and Commercial Buildings Departments.

In a consolidation of two anthracite area divisions, Pennsylvania Power and Light Co. has named F. C. MUELLER, Wilkes-Barre division manager, vice-president of the new Luzerne division.

J. S. DAVIDSON, now division manager at Hazleton, moves to Harrisburg in the same capacity. D. A. ELIAS, present head of the Harrisburg division will continue as vice-president until his retirement at the end of the year.

Mr. Mueller resided in Allentown from 1924 to 1926 at which time he was assigned to the office of President Oakes, then special assistant to the operating manager of the utility. He will continue his office at Wilkes-Barre, which will become the commercial administration headquarters of the newly formed Luzerne division.

Mr. Davidson joined PP&L as an assistant to the vice president in 1937, after an association with the Nebraska Power Co. He served as district manager of the Allentown district from 1938 to 1940, when he was made manager of the Hazleton division.

A. H. FORMAN, JR., has been appointed assistant to the president of the Central Arizona Light & Power Co., Phoenix. Mr. Forman was formerly assistant to the vice president of the Mississippi Power & Light Co., Jackson, Miss. He became associated with the Mississippi company in 1929.

G. R. WOODMAN, superintendent of hydro generation, Southern California Edison Co., Los Angeles, has been appointed superintendent of generation with supervision of the hydro, steam, and diesel generation divisions. Mr. Woodman is succeeded by A. C. WERDEN, formerly assistant superintendent of hydro generation. Mr. Woodman started with the company in 1923, and Mr. Werden in 1926.

EDWARD P. GARDNER, assistant treasurer of the New York Power & Light Corp., Albany, N. Y., for five years, has been elected treasurer. He succeeds JAMES M. SEAVY, who retired recently. Mr. Gardner has been associated with NYP&L and predecessor companies since 1917.

H. E. MONTGOMERY, rate engineer in the statistical department, Central Illinois Public Service Co., Springfield, Ill., has been appointed statistician of the company. He succeeds FRED L. SHIMER, retired. Mr. Montgomery became identified with the company in November, 1912, just four months after his predecessor, Mr. Shimer, had joined the company. In 1919, Mr. Montgomery left the company to serve as electrical engineer for the Illinois Commerce Commission, returning in 1941. He became rate engineer in the statistical department in 1945. After serving as superintendent of various districts and as manager of the southern division, Mr. Shimer was promoted to company statistician in 1934.

W. E. MONTGOMERY, formerly assistant operating engineer, Southern California Edison Co., Los Angeles, has been appointed operating engineer to succeed the late P. H. Gilbert. A. G. DENYER has been appointed to succeed Mr. Montgomery. Mr. Montgomery has a long company service record to his credit, having started as an apprentice substation operator in 1926. Mr. Denyer joined the company in 1914.

Michigan Celebrates Consumers Power Company's Connection of 100,000th Farm Customer

(*Continued from page* 380)

tion, is completely equipped with modern electrical devices.

FARMERS HAIL POWER AS GREATEST BOON

"Electricity has made a tremendous difference in life on the farm in the past 10 or 20 years.

"You can have the word of farmers who attended the Consumers Power company's 100,000th electrified farm celebration for that.

"Waldo Hoffman, who lives five miles north of Hudson, has seen plenty of changes in farm life, but electricity has made the greatest difference.

"He recalled, as he ate a beef sandwich at the barbecue Thursday, the days when his home didn't even have rural mail service. That was back when he was going to high school in 1897. He used to pick up mail in town for the neighbors along the road.

Biggest Problem

"The biggest problem then was to get water to cool the milk.

" 'We used windmills,' he said, 'and

in the evening when we needed the cool water, the wind would die down.'

" 'When we got electricity,' he added, 'all of that changed. We had water when we needed it for the milk. Then we got milkers, refrigerators and stoves. It's not like it used to be.'

"Mr. Hoffman isn't active in farming any more but he still thinks of electricity as one of the greatest aids on the farm.

"Maurice Baxter of Pittsford doesn't remember back that far, but he wouldn't want to try to run a farm now without electricity. He has a milker, pump, lights and a number of household appliances. It's cheap power, he finds.

Woman's Angle

"Mrs. Harley Rush, a neighbor of Mr. and Mrs. Cletus R. Fredericks, on whose farm the celebration was held, gave the woman's angle on electricity on the farm.

"She was amazed by a device she saw on display at the celebration—an electrically-powered, automatic chicken feeder. A slowly-moving chain pulled feed from a bin, dragging it along small troughs. The man in charge of the exhibit explained that a time-clock on the motor would turn it off and on.

" 'That thing would take a lot of work out of farming,' she said.

"But electricity already has done that for the housewife.

" 'I always wanted to live in town,' Mrs. Rush said, 'so I could have a bathroom. Now I have that and just about everything else I could get in town so I wouldn't leave the farm for anything.'

Disagreeable Features

Mrs. Rush remembers the old coal oil lamps, the hand pumps and other disagreeable features of farm life.

" 'Now I think I have just about everything,' she said. 'Electric stove, mixer, pump, complete bath, refrigerator, washer, and, of course, we use milking machines.'

"Carl Maute of Grass Lake, a leader in the county 4-H club electrical project, gets a laugh out of references to electric stoves.

"He recalled that when he and Mrs. Maute moved to their farm they had both wood and electric stoves for cooking.

" 'They always told us,' he said, 'that when you cooked on a wood stove you never would be satisfied with anything else. I think we used that wood stove just once after we got our electric stove.'

Supports Program

"Carl Buskirk of Paw Paw, president of the Michigan Farm bureau, who was a guest at the celebration, offered a thought on the development of the privately-owned power companies in Michigan.

" 'I certainly wouldn't want to see rural electrification in Michigan entirely in the hands of the govern sponsored companies,' he said.

"Mr. Buskirk has spoken in Ja and in many other cities of the st his observation of agriculture in land.

" 'I have seen what they have there, with government controls phases of farming, and I don't w see the same thing here. I am gl see these companies do a good rural electrification in Michigan.'"

CONVENTIONS AND MEETINGS

NOVEMBER

2-4 American Society of Civil Engineers, Washington, D. C.
7-10 National Electrical Contractors Association, Rice Hotel, Houston, Texas.
14-18 National Electrical Manufacturers Association, Chalfonte-Haddon Hall, Atlantic City, N. J.
17-18 Pacific Coast Electrical Association, Inc., Annual Fall Conference, Fresno, Calif.
21-23 Wisconsin Utilities Association, Electric and Gas Sections, Schroeder Hotel, Milwaukee, Wis.
28-29 American Society of Mechanical Engineers, Annual Meeting, New York, N. Y.
28-29 Prime Movers Committee, EEI, Hotel New Yorker, New York, N. Y.

DECEMBER

8 Industrial Relations Committee, EEI, New York, N. Y.

1950

JANUARY

18-19 Industrial Relations Committee, EEI, Roosevelt Hotel, New Orleans, La.
30-Feb. 3 American Institute of Electrical Engineers, Winter General Meeting, New York, N. Y.

FEBRUARY

13-14 Electrical Equipment Committee, EEI, Netherlands-Plaza Hotel, Cincinnati, Ohio
16 Industrial Relations Committee, EEI, Palmer House, Chicago, Ill.
20-21 Transmission and Distribution Committee, EEI, Statler Hotel, Detroit, Mich.

MARCH

13-16 National Electrical Manufacturers Association, Edgewater Beach Hotel, Chicago, Ill.
16 Industrial Relations Committee, EEI, New York, N. Y.

APRIL

10-14 American Society of Mechanical Engineers, Spring Meeting, Washington, D. C.
17-19 1950 Conference of Electric and Gas Utility Accountants, Brown Hotel, Louisville, Ky.
20 Industrial Relations Committee, EEI, Netherlands-Plaza Hotel, Cincinnati, Ohio
24-26 Purchasing and Stores Committee, EEI, Schroeder Hotel, Milwaukee, Wis.
25-26 Pennsylvania Electric Association, Accounting Conference, Pittsburgh, Pa.
26-28 American Institute of Electrical Engineers, North East District Meeting, Providence, R. I.

MAY

1-4 38th Annual Meeting, Chamber of Commerce of the USA, Washington, D. C.
11-12 American Institute of Electrical Engineers, Great Lakes District Meeting, Jackson, Mich.
15-18 54th Annual Meeting, National Fire Protection Association, Haddon Hall, Atlantic City, N. J.
23-26 National District Heating Association, Grove Park Inn, Asheville, N. C.
31-June 2 Pacific Coast Electrical Association, Inc., Reno, Nevada.

JUNE

5-7 Edison Electric Institute, Annual Meeting, Atlantic City, N. J.
12-16 National Electrical Wholesalers Association, Atlantic City, N. J.
12-16 American Institute of Electrical Engineers, Summer Meeting, Pasadena, Calif.
19-23 American Society of Mechanical Engineers, Semi-Annual Meeting, St. Louis, Mo.
26-30 American Society for Testing Materials, Atlantic City, N. J.

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